A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

May 15, 1952

UNIV. OF MICHIGAN
MAY 16 1952
ST ENGINEERING

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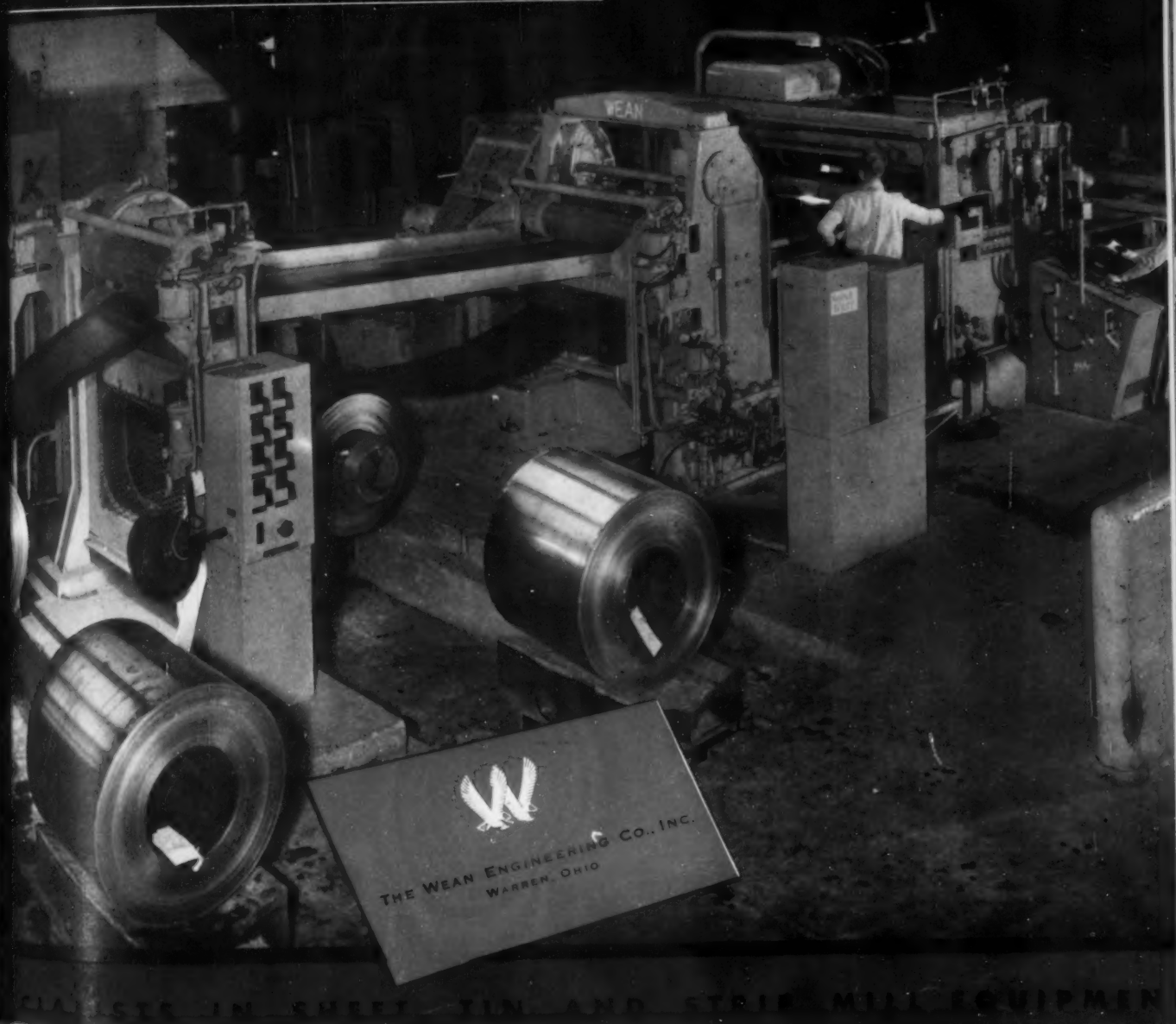
the WEAN
ENGINEERING COMPANY INC.
WARREN, OHIO



CLASSICS IN SHEET, TIN AND STRIP MILL EQUIPMEN

In "Pushbutton Plant" Farval systems supply automatic lubrication

● Not far from Detroit there's a Factory of the Future. Almost automatically, it turns out V-8 engines for a well-known motor car. Uniformity of parts, produced with unfailing precision and high efficiency, is the goal.

Heart of the manufacturing process is a battery of units, synchronized and conveyorized, that mill, drill, bore, ream and tap the cylinder blocks. Continuous operation of this group of machine tools and protection of their precision work are insured by adequate lubrication—continuous, automatic lubrication with Farval Centralized Systems.

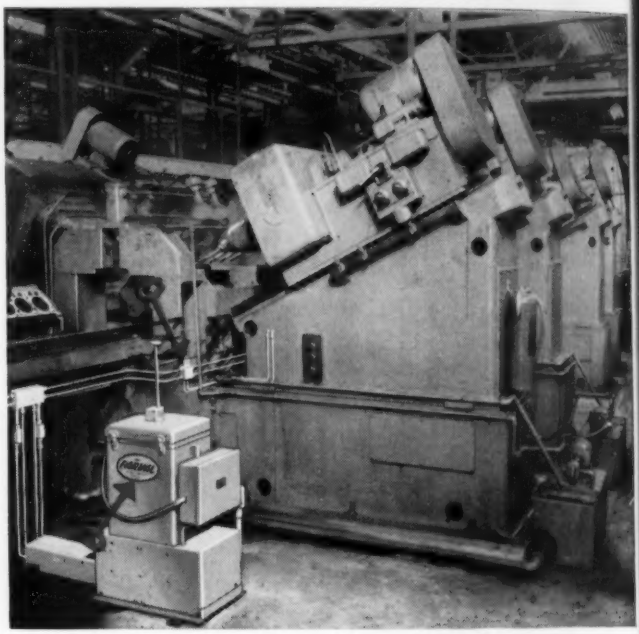
Farval lubricates all bearings while the machines are in operation. Result: No shutdowns to lubricate or replace bearings that might fail due to inadequate oiling. Labor is saved, lubricant is saved, bearing expense is saved, and most important of all, production time is saved.

Farval is the original Dualine system of centralized lubrication for industrial equipment, proved practical in 25 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, the Farval system unfailingly delivers oil or grease to each bearing —as much as you want, exactly measured—as often as desired. Indicators at all bearings show that each valve has functioned.

In or near your city there's a Farval engineer, ready to discuss your lubrication problems and suggest a proper system to meet your particular needs. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

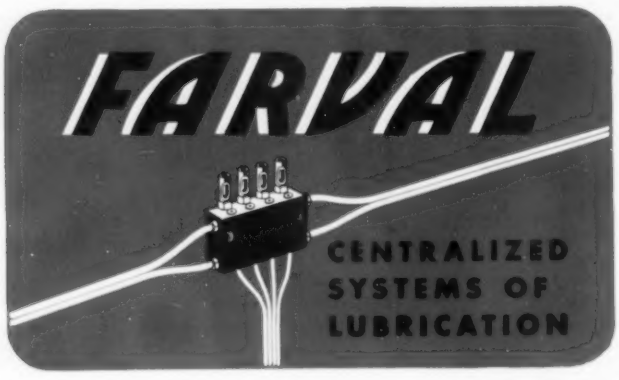
FARVAL—*Studies in Centralized Lubrication* No. 138

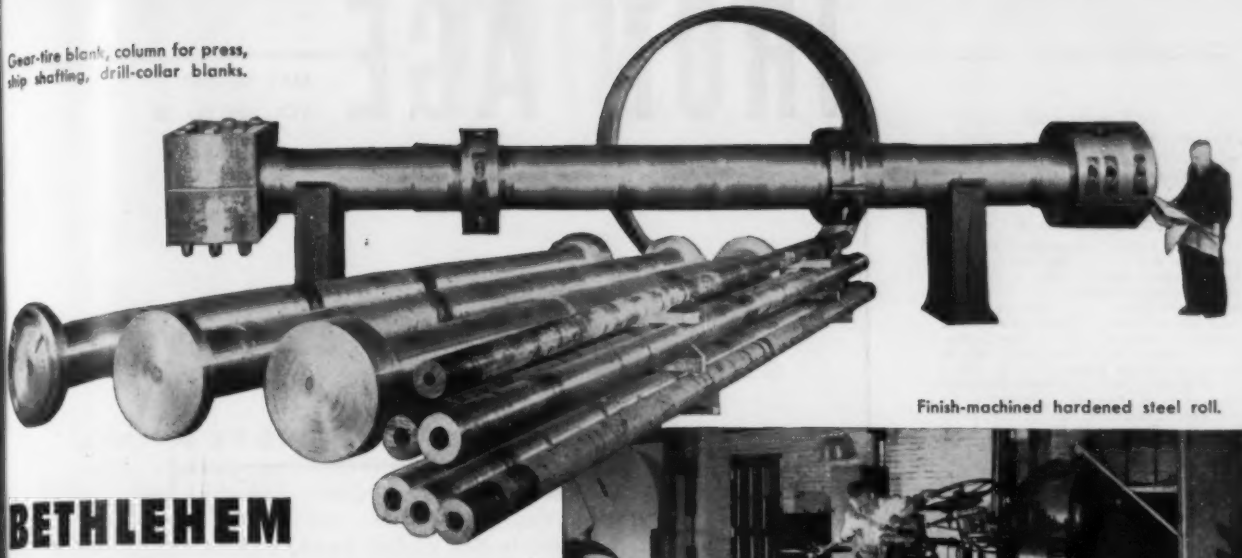


KEYS TO ADEQUATE LUBRICATION—*Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and automatic central pumping station—you know a machine is being properly lubricated.*

In the machine illustrated, last in the line, you can see an engine block being tapped. A finished block rests on the conveyor at left, center.

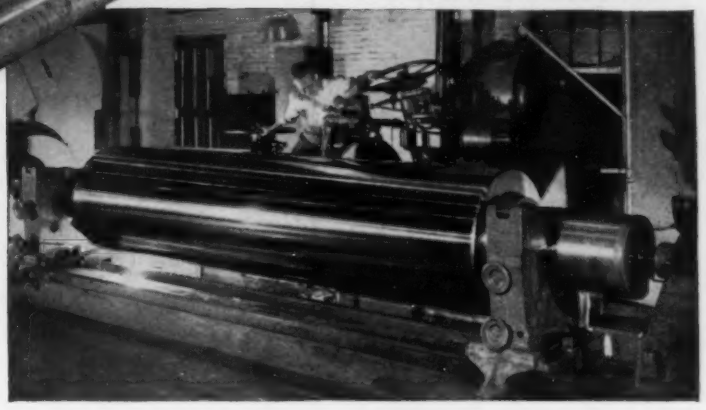
Farval manually operated and automatic systems protect millions of industrial bearings.





Gear-tire blank, column for press, slip shafting, drill-collar blanks.

Finish-machined hardened steel roll.



BETHLEHEM MAKES SO MANY TYPES OF FORGINGS

We're almost tempted to say we make every type of steel forging. But, to be conservative, we'll say *practically* every type . . . starting with small drop forgings and ending on the top side with giant pieces weighing many tons.

Shown on this page are some random samples of Bethlehem forgings. You would of course see many, many others today on a trip through the Bethlehem shops. You'd see hammers and presses turning out big parts, small parts, and everything in between. You'd see plenty of these items being rough- or finish-machined.

It isn't that we're trying to sound impressive. But we *would* care to have you know how well we're fixed to make and machine forgings. Bethlehem is an old, old hand at this business. Could our experience be helpful to you?

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation; *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Rough-turned, smooth-bored vertical shaft for hydroelectric unit.

IRON AGE

MAY 15, 1952
VOL. 169, No. 20

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THE IRON AGE
Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N.Y.

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Circulation Representatives: Thomas Scott, James Richardson.

One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

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Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, $15; other Foreign Countries, $25 per year. Single Copies 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cable address "Ironage" N. Y.

Audit Bureau of Circulations

Society of Business Magazine Editors

Controlled Circulation Audit

National Business Publications

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DIGEST

of the week in metalworking

PAGE 67 **BRAZIL HAS TREASURE LODE OF IRON ORE**
Brazilian miners high on Caué Peak, in the Minas Gerais section, are pecking away at one of the richest iron ore lodes in the world. Ore now being mined is near-perfect hematite, running 69 pct Fe. Minas Gerais holds up to 25 pct of world reserves. Shipments now are 1.5 million tons yearly.

PAGE 70 **FOUNDRY BUSINESS CONTINUES BECALMED**
Activity of the nation's foundries continues from poor to terrible. Most are on 4-day weeks, with some struggling at 3 days. What has hurt was the large stockpile of castings built up right after Korea. Not too consoling is the fact that raw materials are ample. Cast scrap is plentiful.

PAGE 71 **BAR SUPPLY BARRIER TO SHELL EXTRUSION?**
Steel producers are worrying about the growth of cold extrusion of artillery shells. Any great reliance will strain the bar supply, some executives fear. Other military uses for the products of these bar mills may suffer if demand for cold extrusion bars is substantially increased.

PAGE 73 **STEEL UNION RAISES MANY VITAL ISSUES**
Public interest in the steel dispute has been on wages and prices. Other just as important issues have been lost sight of. These are: management rights, retroactivity, seniority, incentives, local working conditions. They must be settled at the bargaining table before a contract is signed.

PAGE 86 **AUTO DEALERS CELEBRATE END OF REG. W**
With the passing of the much-despised Reg. W, setting harsh credit controls on car sales, happy auto dealers are set for crowds in their showrooms. Most companies issued statements ranging from joy to cautious approval. Some feared inflation. Others sought more aggressive sales techniques.

PAGE 91 **REVAMP AND UNIFY STOCKPILING PROGRAM**
The Pentagon is setting new rules for stockpiling materials for national defense. The Munition Board's Office for Materials now wears two hats. It will allocate to military departments and decide how much of what shall be stockpiled. The move is calculated to halt departmental dogfights.

PAGE 97 **STAKE YOUR CLAIM IN MINERALS HUNT!**
Canada's prospectors have caught a modification of the gold rush fever. Now minerals and new deposits are breaking out all over—even in thickly populated areas. One area of farmlands is being quietly bought up. The motive is not believed to be planting. A new iron deposit has been found.

PAGE 109 **FOUNDRY TACKLES SHELL MOLD PRODUCTION**
Shell mold castings of gray and ductile iron have been successfully produced for 6 months in a pilot plant operation of the Lynchburg Foundry Co. Two men handle work on a specially designed 4-station machine producing the molds. Uniform heating of patterns simplifies stripping of the shells.

PAGE 114 **COREMAKER USES ULTRA-MODERN CONTROLS**
Automatic electric timers, solenoid air valves and air cylinders make up the nerve system of a new automatic core making machine. Core boxes rotate through 5 stations. Operated by only two men, the machine has achieved output of over 300 cores per hour in operation at General Motors Corp.

PAGE 126 **ABRASIVE BELT MACHINE GRINDS JET BLADES**
Four cams control the tricky job of grinding jet engine blade airfoil sections. One is of course the airfoil master. Another keeps belt contact normal to blade surface. A third gives compound motion at blade roots. The fourth cam keeps surface speed nearly constant over contour changes.

PAGE 165 **STEEL LOSSES CAUSE LITTLE CONCERN**
Loss of 2.5 million ingot tons of steel output because of strikes has had little effect on the market. There will be bigger third-quarter carryovers on scarce items. But consumers aren't rushing to hedge their position—even in the face of expected price rises. Court decision awaited.

NEXT WEEK **AUTOMATIC TRANSFER SHELL FORGING LINE**
Fully automatic high production hot forging shell line has proven successful. No manual labor is required from the time the hot billet leaves the furnace until the shell drops out, completed, on a conveyor belt at the end of the line. Air-driven transfer equipment is electric-controlled.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Now you can see the difference between grommet belts and ordinary V belts

B. F. Goodrich grommet V belts last longer, serve better, save money

THE "X-ray" belt, made of transparent material, was developed just to show you the exclusive B. F. Goodrich grommet construction. Now you can look beneath the surface of a V belt, see for yourself what makes B. F. Goodrich grommet V belts last longer, keep running with fewer interruptions, need less attention.

Note the twin grommets — Each of these grommets is like a giant cable except that it's *endless* — a cord loop built up by winding heavy cord on itself. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. Your local BFG distributor has an "X-ray" demonstrator belt and will be glad to show it to you. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

the Iron Age
FOUNDED 1855

Relaxation Or Decontrol?

DON'T look now but the boys in the back control room are cooking up something for you. It will have a nice-sounding name but don't be misled. It will be done up in a nice package to allay your fears.

It may be that the flag will be waved vigorously in the name of national preparedness and danger. The boys will even be able to garner some big names from your ranks to make the thing look good.

Ever since the output of steel and other materials has been meeting demand there has been consternation in the control camp. It is their idea that they know more about production than you do.

Many in the control picture don't feel this way, but a lot do. They hope to bind you with controls as long as Stalinist Russia exists. That will be a long, long time.

Patriotic industrialists in steel and other industries want an end to controls over materials. They want an end to allocation of materials when those materials are sufficient to meet all demands—military and civilian.

None of these businessmen wants an overnight end to material control. They want a careful, prudent and slow decontrol so as not to wreck the economy. They want a sound and sensible decontrol so that the distribution of materials like steel will go back where it belongs—to industry. But they want this decontrol handled properly.

Those in Washington who have the power or a controls complex have coined a new word—"relaxation." We will "relax" controls they say. In this way industry can again have something to say about its business. But it will be necessary to have "standby" power so that controls can be slapped on again in an emergency.

Who calls the emergencies? Why they do of course. This so-called relaxation is a gimmick to keep the strings on industry and tighten them when it looks—to control people—like a new emergency is here.

This will not do. Relaxation is nothing more than another name to keep industries like steel tied to will-o'-the-wisp ideas in Washington. Don't be misled by "relaxation." We should settle for nothing less than complete orderly decontrol in steel and other industries.

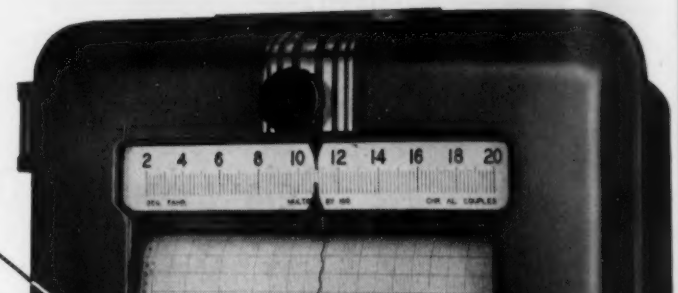
Tom Campbell

Editor

TEMPERATURE CONTROL

Matched to your plant's

FURNACE PRODUCT PRODUCTION



Need to get more work out of your furnaces and ovens? The pyrometer that fits the heating equipment, the product and the production need can do a great deal to turn out more tonnage, and also more that meets specifications.

Two Types of Control

The secret of successful automatic control is very simple; just turn the heat up and down in the particular way the furnace and product prefer. And there are only two general ways: On-Off Control, and Three-Function Control.

On-Off Control Can't "Think"

On-Off Control turns the fuel all the way up when temperature drops to a predetermined low point; turns it all the way down again at the specified high point. Temperature will of course undershoot and overshoot; when cycling is inside bounds, this simple control is very popular.

Three-Function Control Can "Think"

Instead of turning fuel up and down at preset limits, three-function control in effect, keeps looking at temperature trends. If they are trying to get out of hand, the Controller heads them off. This "thinking" is done in three ways:

1. Fuel is turned up and down in proportion to the furnace's heat change. (Function one)

2. If the furnace doesn't respond when the fuel is changed, the instrument waits a little—moves the valve again—keeps this up until the furnace does respond. (Function two)

3. If the temperature jumps, as when a heated charge is removed or a fresh charge put into a furnace, the speed of the resulting change can be considered by the Controller. (Function three)

User Tunes the Control

By turning dials on the control pyrometer, the user tunes the three functions to the process: he simply uses his common sense and experience. A big benefit is thus: that every furnace control can be tuned by the best-qualified man in the plant.

Further information on request; contact nearest L&N office or 4956 Stenton Ave., Phila. 44, Pa.

LEEDS NORTHRUP

Jrl Ad N-33-(52a)

Dear Editor:

Letters from readers

Second-Hand Americans

Sir:

Several of us have read with a great deal of interest your editorial entitled "Are You A Second-Hand American?" in the Apr. 24 issue. We would like to have your permission to reprint this editorial in our company paper which is distributed to our employees in our four plants.

V. L. BRADFORD
Vice-President, Sales
Milford Rivet & Machine Co.
Milford, Conn.

Cobalt 60

Sir:

A reprint of your article "Cobalt 60 For Low Cost Radiography," appearing in your Aug. 24, 1950 issue, has just come my way.

I think you will be interested in what we are doing in gamma radiography in England. I think we are well in advance of anything in the States.

The old capsule suspended from a bit of string is as dead as can be here. It is still the only way known in U. S. A.

There is one thing in your very excellent article which puzzles me. You say that cobalt 60 can be purchased from the AEC for $50 per curie for the first two curies and $5 for each curie thereafter, plus handling and packing costs. It is hard to believe that radiographic sources can be produced at the very high activities required at such low cost, even by the AEC and even if sold at a loss.

Can you explain this apparent contradiction to me?

M. FALK
M. Falk & Co. Ltd.
London

Surprising as it may seem the price of cobalt 60 is correct.—Ed.

Oriented Silicon Steel

Sir:

Your Newsfront page is apparently widely read by members of our organization because several have called my attention to the item in the Apr. 10 issue stating that, "One steel company is now supplying transformer grade cold-rolled grain-oriented silicon steel in welded coil form. . . . The product is still in the development stage and is not available for sale to all comers."

While we do not question the accuracy of this item, it may be a little misleading. Our company went through this stage of processing some years ago and has passed on to more advanced processing of oriented silicon steel.

Prior to 1940 our research metallurgists and operating people had been working toward the development of a successful product of this type. In 1940 or 1941 we produced a considerable quantity of oriented silicon steel by means of the processing you described.

By approximately 1943-44 we had learned enough about coil annealing to enable us to produce cold-rolled oriented silicon steel that was processed all the way through to the final product in coil form. This product was sold on a restricted basis until 1946, when we announced its commercial availability.

H. V. MERCER
Mgr., Advertising Dept.
Armco Steel Corp.
Middletown, Ohio

Increases Melts

Sir:

On your Apr. 10 Newsfront page the following item appeared:

"Melt shop experimentation and better application of rammed refractories in induction furnaces now permit one stainless steel shop to increase the number of 6500-lb melts obtained per lining from 40 or 50 to over 150."

Could you give further details as to product used and where the experiment was tried?

L. R. BURNETT
Kaiser Aluminum & Chemical Sales, Inc.
Oakland, Calif.

We expect to have an article on this practice soon. In the meantime you can write to H. J. Verner, chief engineer, Eastern Stainless Steel Corp., Baltimore, Md.—Ed.

Enameling Sheet

Sir:

In your issue of Apr. 24, p. 85, you referred to a new treatment for enameling sheet. Can you put us in touch with the manufacturers who can tell us more about this process which eliminates the ground coat so that porcelain enamel can be applied to ordinary 1020 cold-rolled sheet.

C. S. THOMAS
Buyer, Tube Purchasing
Radio Corp. of America
Harrison, N. J.

A complete story on this new treatment for enameling sheet appeared on p. 95 of our May 1 issue.—Ed.

Help Lower Unit Production Cost to Meet Competition *Profitably . . .*

Simplified screw driving, bolt setting and nut running mean lower unit cost. This is possible with Pheoll products because they are inspected through all manufacturing steps from coil wire or bar stock to the finished product.

All threads, whether rolled or cut, are carefully gauged to American Standards. Screw and bolt heads are formed, slotted or recessed to meet rigid engineering requirements. Overall quality of the finished product is uniformly high. Precision head formation on all bolts as well as engineered slots and recesses in all screws means less wrench and driver slippage.

Pheoll engineers will recommend the correct type, size and finish of standard or special screws, bolts and nuts for your needs.

WHAT PHEOLL INDUSTRIAL FASTENERS MEAN TO YOU

- Simpler and speedier assemblies.
- Less worker fatigue — more units.
- Improved product appearance.
- Added latitude in product design.
- Immediate and dependable source for standardized, interchangeable screws, bolts and nuts especially suited to mass production.

CHECK THESE PHEOLL PRODUCTS FOR YOUR NEEDS

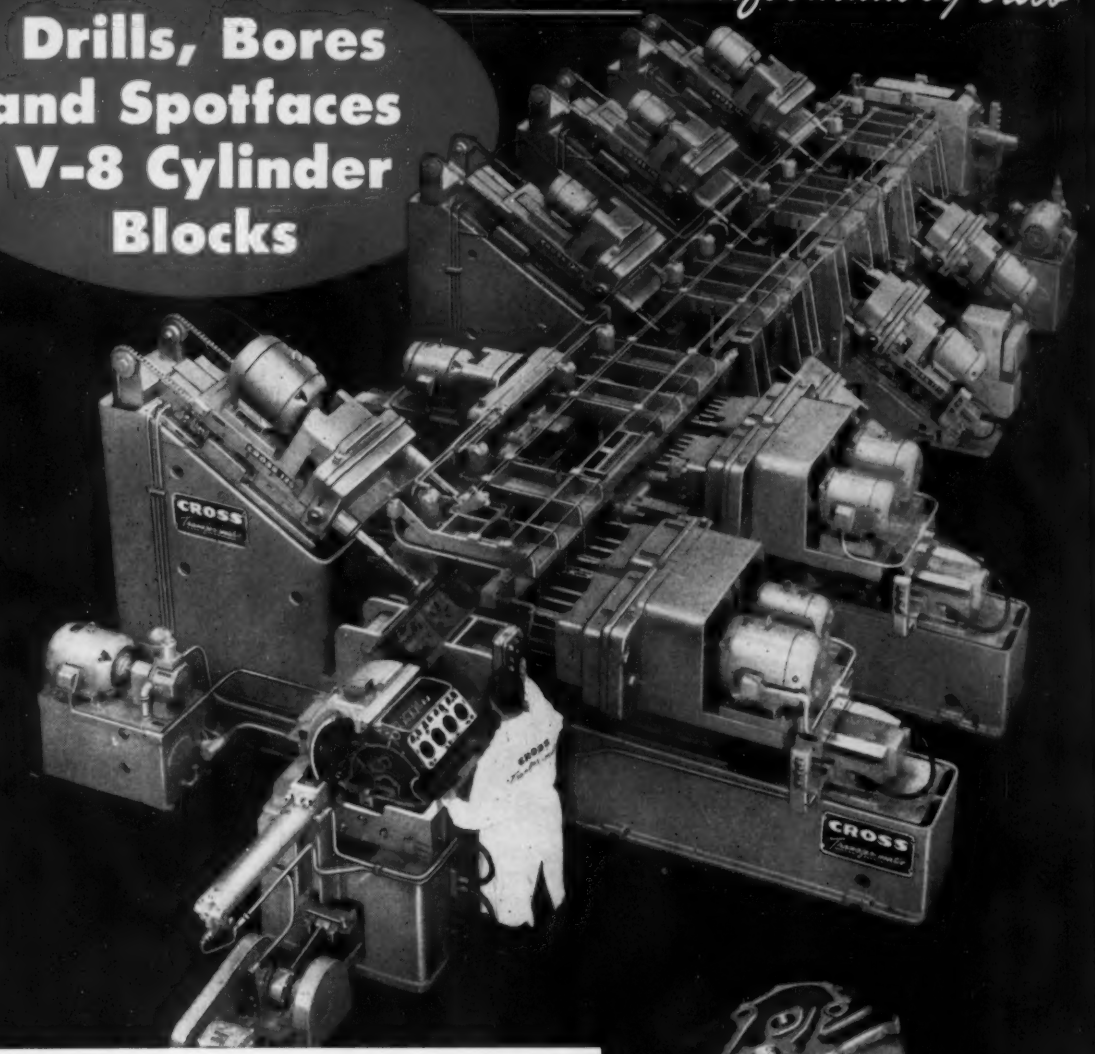
- ☐ Machine Screws
- ☐ Sems
- ☐ Tapping Screws
- ☐ Square Head Set Screws
- ☐ Threaded Cutting Screws
- ☐ Cap Screws
- ☐ Phillips Recessed Head Screws
- ☐ Machine Bolts
- ☐ Wing Nuts
- ☐ Knurled Nuts

Write for literature

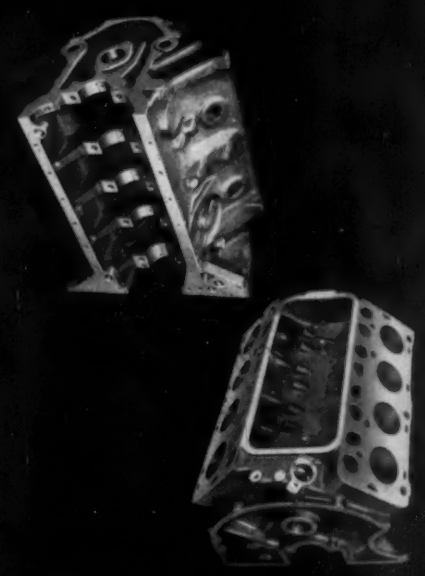
Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS

Another Transfer-matic by Cross

Drills, Bores and Spotfaces V-8 Cylinder Blocks



- ★ Drills, bores, spotfaces and reams 120 V-8 cylinder blocks per hour at 100% efficiency.
- ★ 19 stations—one for loading; ten for drilling, boring, reaming, countersinking and spotfacing; two for gaging; one for cleaning; four idle; one for unloading.
- ★ J.I.C. standard hydraulic and electrical construction with stranded wire.
- ★ Hydraulic locating, clamping, positioning and transferring.
- ★ Cross Machine Control unit to automatically stop machine when tools need changing.
- ★ Pre-set tools.



Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Fatigue Cracks

by Charles T. Post

Atomic Age

Nearly every time the Atomic Energy Commission hits the newspapers, it's in connection with another atom bomb which has exploded or with the hydrogen bomb which may. With far less fanfare, evidence is mounting that this group is clearing new trails in completely different fields.

Facsimile transmission is a case in point. Way back before the war, we can remember predictions that it wouldn't be long before you would be reading a morning newspaper that had come over a facsimile receiver during the night rather than having a newsboy deliver it to the door. A California paper, we believe, actually made some tests.

Not until last year did we hear any more about the subject. Then we learned that the central library at Oak Ridge was using facsimile transmission to provide the widely scattered technical installations there with prompt service on technical data. The original data, in the central library, thus could serve many times the number of readers than were it carted from place to place.

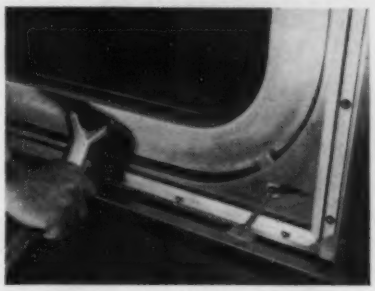
Today we have a letter from the Library of Congress in Washington, D. C.: "The Library of Congress contemplates installing a facsimile transmitter on an experimental basis. The receiver will be placed in the Atomic Energy Commission Library where it can serve a group of government agencies. These libraries have frequently requested the official loan of bound and unbound copies of THE IRON AGE."

The proposal involves a partial copyright release, which we're tickled to death to give. To show that we can look as far into the future as the Atomic Energy Commission, we conceivably can see the day when you will be reading *your* copy of your f.f.j. on a facsimile receiver. And we hope that Fatigue Cracks isn't blurred in transmission.

Puncture Proof

You can't stop these aluminum boys. W. L. McCague, Alcoa's p.r. man, read our description of the window washing platforms which let down from the roof on the Lever House and Mellon Bank buildings and immediately dismissed the whole approach as "old shoe."

"Couldn't resist telling you about the *reversible* aluminum windows in the new Alcoa Building here (Pittsburgh), since *these* lads



won't have to bother with platforms, safety belts or assorted rabbits feet. The cleaner simply wheels a pram-like cart into the office, deflates an integral rubber tube, unlocks the window with a special key and reverses it for washing. Then he closes and locks it, inflates the tube to a standard 15 lb air pressure, and proceeds in record time to the next window."

The Alcoa windows are double glazed. The butyl rubber core insures air-tightness. Only thing that bothers us is the thought that some absent minded window washer will get distracted by some pretty secretary during the inflation period—and then what a blowout there'll be.

Puzzlers

The flies in last week's puzzler walked at the rate of 7½ in. per sec and their trip took 6 sec. Richard started out facing 60 degrees from North and John 120 degrees from North.

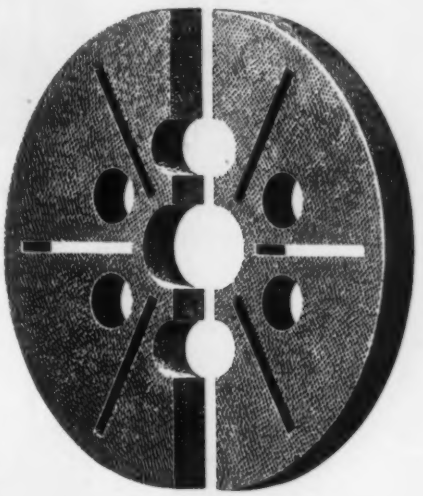
The number problem proved popular and apparently not too difficult as evidenced by correct answers from the following:

R. A. French, American Industrial Mfg. Co.; W. A. Makely, Ravena Iron Co.; C. M. Gordon, General Electric Co.; H. Cohen, American Pipe Supply Co.; M. E. Lanser, Cleveland, Ohio; L. D. Rice, Timken Roller Bearing Co.; M. Marcus, Detroit Diesel Engine Div.; H. K. Moore, Eaton & Howard Inc.; C. E. Whisman, Fishing Tackle Co. of America; M. J. Garrett, Highland Machine Co.; J. Larkin, Larkin Packer Co.; W. E. McCord, Baltimore, Md.; R. M. McCall, St Paul, Kansas; C. E. Norton, Chicago, Ill.; R. W. Huff, Canton, Ohio; P. Connor, Cleveland, Ohio; A. Ackerman, Ameximpo, Inc.; E. G. Leach, International Harvester Co.; H. W. Hennigar, Motor Wheel Corp., and C. E. Blass, Talon, Inc.

The ladder puzzle has been solved by A. Romeo, Denison Engr. Co. and M. Sacks, The Barrett Div.

R. W. Shanks, International Harvester Co., asks, "If one-half of five is seven what part of nine is eleven?"

Western Felt users over a long period of years have placed their stamp of approval on a long list of its products. They know from experience the "plus value" in every Western Felt component part. Highest precision in its processing and cutting produces a uniformity that minimizes rejections—prevents failure of the finished product from felt causes. They are available from wool softness to rock hardness—never lose shape—do not ravel or fray—resist oil, water, age—are resilient, flexible, compressible—may be cut to close tolerances.



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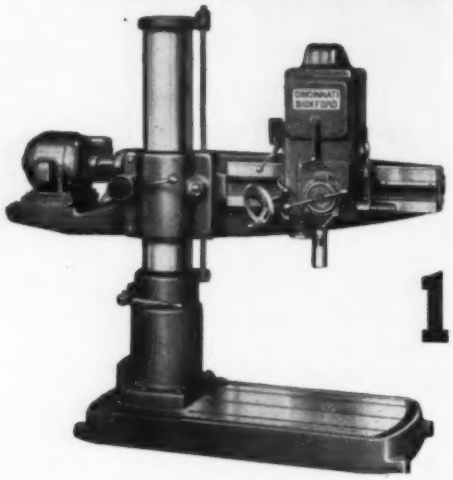
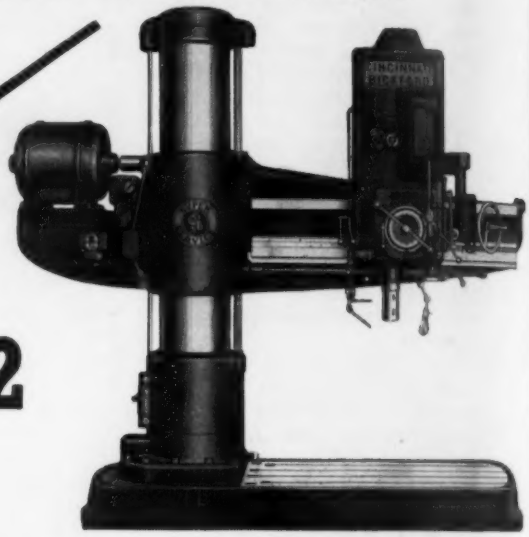
Write for literature on machines of interest to you.



1

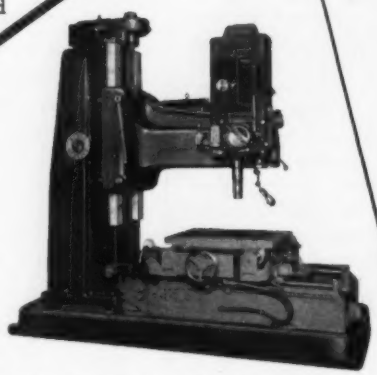
The 9" Diameter Column SUPER SERVICE Radial Drill, described in Circular R-21B, is built in either a 3' or 4' arm length with 9 speeds and 4 feeds powered with a 3 HP driving motor.



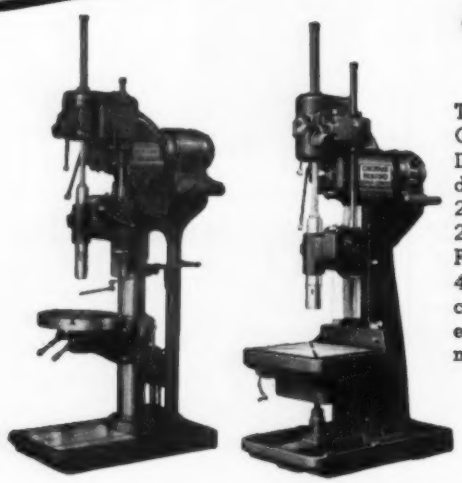
2

The 36-speed 18-feed SUPER SERVICE Radial Drill, described in Booklet R-29, is furnished in 11 different standard sizes, ranging from 3' to 8' arm lengths and 11" to 19" diameter columns. Machines are furnished with 7½ to 20 HP driving motors.

3



The new SUPER SERVICE Precision Drilling Machine is especially suited to operations in conjunction with an automatic spacing table. This 36-speed, 18-feed, 10 HP motor machine is more completely described in Circular FH.



4

The SUPER SERVICE General Purpose Upright Drilling Machines, as described in Booklet U-25-A, are furnished in 21", 24" and 28" sizes. From 9 to 12 speeds and 4 to 9 feeds. The machines are powered by either 3, 5, or 7½ HP motors.

5

The SUPER SERVICE High Production Manufacturing Uprights have many of the advantages of the general purpose drilling machines but, due to their simplified construction, they are much more economical. They are furnished in 21", 24" and 28" sizes with 3, 5, 7½ or 10 HP driving motors. Booklet U-27 will furnish you more complete details.

RADIAL AND UPRIGHT SUPER SERVICE DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Comfortable pig iron inventories would permit most foundries to keep operating for a month or more in event of a long steel strike. Most have ample supplies; some actually exceed NPA inventory limit of 30 days. Main worry is lack of business, not lack of pig iron.

► An electro-erosion machine being built for Army Ordnance by a major machine tool builder will be the most versatile piece of equipment yet developed. It will permit straight cutoff and shaping; straight, radial, and form grinding; boring; and grinding of chipbreakers. Principal use will be shaping, finishing, and regrinding of single-point carbide tools.

► Unless the oil strike is settled soon steel mills will be hard pressed. One mill reports a less than two week supply. Oil burning ore boats were being docked as early as last week.

► Aluminum manufacturers predict that the amount of aluminum used in the automobile will be doubled by 1954 when the automotive industry is expected to consume more than 200 million lb. Increased use is expected in cylinders, blocks, heads, radiators and torque converters.

► A patented device permits side charging of cast iron borings and turnings directly into cupolas. The practice has been used in a British foundry since last October. There is practically no metallic loss and costs are said to be very low. Borings are charged below the burden and just above the melting area by a reciprocating air operated bar.

► Some students of the Supreme Court believe the steel industry will regain their plants. They think the court will rule against Mr. Truman without bias to any future emergency seizure--providing a real emergency exists. There is a possibility that the court may send the case back to the lower court for proof of emergency.

► Metal powder sales are down to 60 pct of the 1951 volume. Shipments of iron powder are running some 600 tons a month compared to 1000 last year. Decline is attributed to slowed military expansions and the end of consumer scare-buying.

► Excitement about shell molding innovations in the foundry trade has caused many to overlook the potent possibilities in shell cores. These cores on a cost comparison basis with regular sand cores are much more favorable than are shell molds versus sand mold making costs.

► Uranium contaminated scrap steel may soon be released for sale through commercial scrap channels in one area. Pipe, tubing or other metal forms in which uranium bearing material forms a caked sludge will not be resold. Lifting of restrictions will apply to uranium contaminated scrap.

► Ceramic paper made from aluminum silicate clays will withstand temperatures up to 2500°F. Combining this paper with Bentonite clay permits the material to be machined.

► Production of shell and fuse quality steel is presently outrunning the ability of munitions makers to use it. Some manufacturers of fuses are said to have a six month inventory on hand and are unable to get the government to cancel some of the incoming steel. Some shell producers are also heavily loaded.

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IRON ORE: Brazil Pecks Away at Vast Blue Lode

Blue hematite just misses perfection, running 69 pct Fe . . . Minas Gerais area holds up to 25 pct of world's ore reserves . . . Ship 1.5 million tons, set taller goal —*By W. V. Packard.*

High on Caué Peak, more than 4000 ft above sea level, workmen are scratching away at one of the richest lodes of iron ore in the world. The blue hematite is so rich it just misses theoretical perfection. Pure hematite would be 70 pct iron and 30 pct oxygen. This ore is sold on a guarantee of 68.5 pct iron. Some shipments actually run above 69 pct Fe, dry content.

Caué Peak is about 300 miles inland in central Minas Gerais, Brazil. It is marked by a town of about 3000 to 4000 people called Itabira; and by a village, newly built to house the workmen. As far as the eye can see, the surrounding terrain is composed of a limitless expanse of hills, hardly scarred by man. Stretching through the hills is a treasure of blue gold—hematite.

A King's View—Standing on the highest peak you can look over the heart of an area thought to contain 23 to 25 pct of the world's iron reserves—or more than 15 billion tons. How much is there? No one knows. Nor will they know for certain for many years to come.

It will take a long time to accurately map and measure the treasure of Brazil's heartland. Present knowledge of this fabulous wealth is like one switch in a great rail center—so much remains unknown. But each bit of new information that comes to light raises the estimates of the vast ore body.

MINING TOWN: These neat living quarters outside Itabira, built by company, are rented to workmen for nominal fee. Company also built school, hospital. High elevation makes climate healthful.

Mechanized — Though the 900 workmen on Caué Peak are barely scratching the surface, they are using modern methods. Companhia Vale do Rio Doce, biggest mining company in the area, has finished its first phase of mechanization and is ready to start on the second.

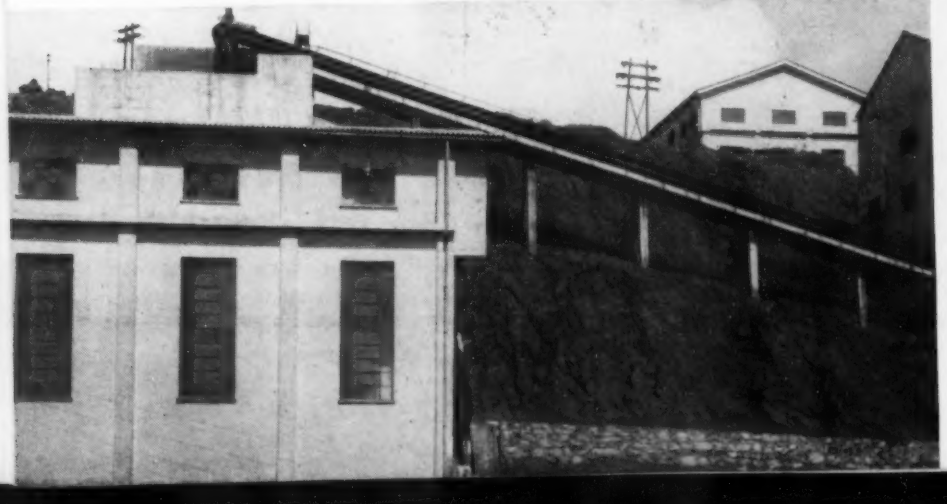
Ore is drilled, blasted, scooped, and moved the short distance to crushing and screening plant by truck. It then goes to the railroad by conveyer, and thence to the port of Vitoria. At the port the railroad circles around a high bluff, and ore is dumped down into bins from where it is moved on ship by conveyer.

Sounds simple, but it's not. It took more than 10 years of hard work to reach the first goal, just now achieved —mining and shipping at the rate of 1.5 million tons per year. Shipments last year were 1,273,978 gross

Blasted ore is scooped out with Bucyrus-Erie 54-B shovel.

All material under one-half inch is rejected with fines.

Crushing and screening plants are connected by belt conveyor.



tons. The new goal is 3 million tons per year.

Recent Progress — Actually, progress has been startlingly rapid in the past 2 years, or since President Vargas appointed Col. Juarcy Magalhaes president of the company, Mar. 27, 1951. The charm and energy of Col. Magalhaes have helped bring cohesion to the company. He's 46 years old, a graduate of Brazil's military school. He's been a soldier all his life, except when elected governor of the state of Bahia at 26, and congressman from the same state in 1945.

Now that Col. Magalhaes has finished his first round of mechanization of the mine, he is striving to improve the railroad, which is a common carrier, hauling people, cereals, coffee, timber, and ore and finished steel for other firms. The rail bed is ballasted with rock only half way—not enough to withstand January and February rains. The balance is being rebuilt at the rate of 8 kilometers a month, which means about 14 months to finish. The Colonel is in the U. S. now, arranging for a loan to buy diesels. His next step is to replace the 75-lb rails with 90-lb rails.

Wasteful Mining — Miners on Caué Peak are wasteful. But they can afford to be. More than 300 million tons of premium ore have been proven at this point. More than a billion tons are thought to rest under the known quantity in the giant lode.

When the ore goes through the crushing and screening plant, only material above ½ in. and below 8 in. is shipped. About 70 pct of ore mined meets this requirement. The "fines" are accumulating in a huge pile. Iron content of rejected material is only a little lower than the high purity ore being used to speed production of American openhearths. A very high quality concentrate could be produced from this material merely by further screening.

Near-Perfect—The ore is surprisingly moisture free — even when mined in rainy season. The author was able to check the

analysis report on one such shipment of 10,000 tons just received by an American company. On being dried at 105°C, the moisture loss was 0.68 pct. Dry iron content was 68.70 pct; phosphorous was 0.023 pct.

An examination of the record on nine shiploads this season showed this: Dry iron content ranged between 68.56 pct and 69.09 pct; silica never above 0.35 pct; phosphorus never above 0.035. A previous shipment provided the startling analysis of 69.90 pct iron, after drying. Vale do Rio Doce Trading Co., New York, an American representative, reports no trouble selling it at a good price.

No wonder a good many American steel firms are willing to pay premium prices to get this fast melting product. They are buying iron and oxygen, and very little else.

Policy—Present policy is to develop the ores of Minas Gerais by Brazilian companies, although manganese ore concessions have been granted to Bethlehem and U. S. Steel. Cia. Vale do Rio Doce is 85 pct owned by the government. It has borrowed from the Export-Import Bank to the tune of $26.5 million, and has met all payments on time.

Physical structure of the ore is good. On Caué Peak drilling averages about a foot a minute. Bit wear is not excessive. Results of compression tests show the ore has an average strength of 48,300 psi, and a maximum strength of 62,300 psi.

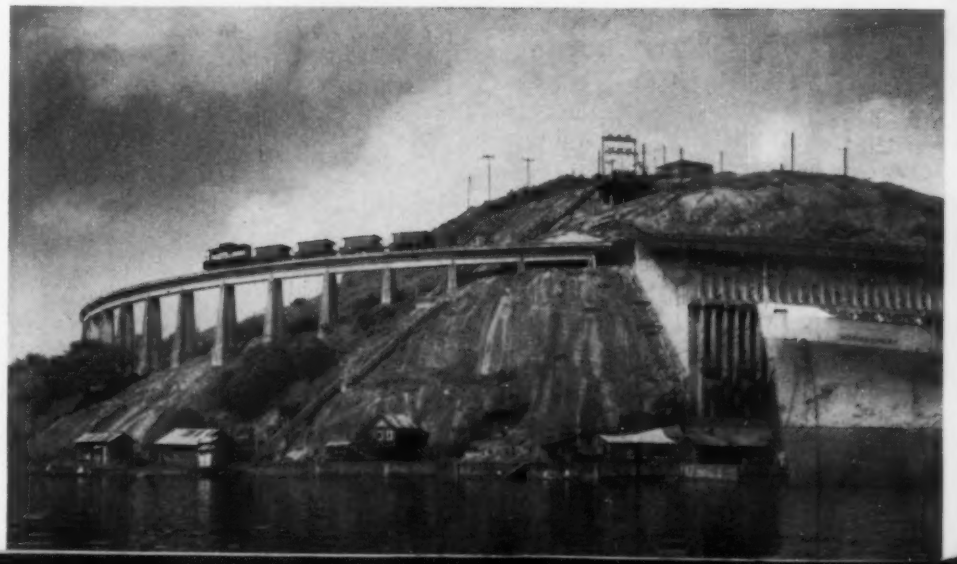
Only the premium lump ore is being exported. But this is by no means the only type of high grade ore available in the area. Vast quantities of soft ore are there, though not so plainly evident because they rarely crop out in plain view. Those tested have been found to be only 1 or 2 pct lower in iron content than the premium lump ore.

The second largest mining operation in the area is the Casa da Pedra Mine of the National Steel Co. of Brazil. Located on the other side of a natural divide, its ore is shipped to the Volta Redonda steel plant.

Bigger conveyer carries premium ore to waiting railroad cars for 300-mile trip to port of Vittoria.

Common carrier railroad lugs the treasure out of the hills and down to the sea.

Ore train circles bluff and dumps cargo into bins. Conveyers move ore from bin to ship for export.



FOUNDRIES: Business Still Becalmed

Slow foundry activity continues . . . Most work 4 days a week . . . Castings stockpiled after Korea . . . Raw materials in good supply . . . Vacation slowup due soon—*By R. L. Hatschek.*

Business for the nation's foundries continues from slow to terrible. Low level activity has continued steadily for most from last summer and the majority are working only 4-day weeks with some down to 3 days and a few operating 5 or even 6 days. The latter are a definite exception.

Generally the lack of orders stems from large inventories of castings built up by manufacturers immediately after the start of trouble in Korea. At that time foundries would receive orders for castings by the thousands—now they get orders for only a few.

Soil pipe foundries can expect a little better business since the let-up on construction controls but here the difficulty lies in over-expansion. They did nothing during World War II and in the period immediately following they attempted to put out 10 year's castings in 5 years. Then came the North Koreans—and controls.

Good Supplies—On the brighter side, inventories of pig iron, scrap and coke are high. With pig iron sure to go up in price as soon as the labor problem is settled, foundrymen feel that pig iron stocks are money in the bank. Foundry iron consumption has been low and most had the maximum allowable inventory of 30 days. Washington then ruled that 60-days' supply was permissible. A buying spree started and today stocks range from 45 to 60 days at most foundries.

Coke has been in good supply and stocks are so high that nobody seems at all worried about what John L. Lewis might do this year.

Unlike steel grades, cast scrap is plentiful and foundries have ample piles of the stuff. And prices have been slipping steadily this year. One foundry purchasing agent was even told by a scrap supplier to name his own price. He bought none.

Scrap men report their cast business is terrible. There just isn't any market for cast, they say.

Summer Coming — Vacations, coming up in another month and a half, are really going to knock the bottom out of the cast market, most foundrymen believe, and pig iron should also turn very free. Foundry vacations this year are going to be long in most instances.

The two short steel strikes haven't affected foundries much as far as their supplies are concerned but, since many of their customers also use steel, foundrymen fear even deeper cuts into their sales. This will be heavily felt by those foundries serving automotive, electrical appliance, refrigeration, railroad and agricultural equipment industries.

In general, foundries serving heavy industries such as machine tools are better off with orders down only about 5 pct. It is also reported that some of the builders in the Air Force heavy press program are reaching to Europe for some of the exceptionally large castings they require.

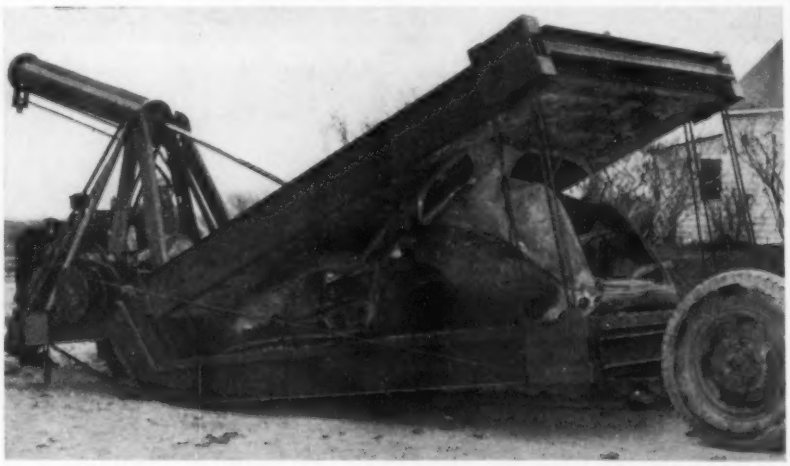
Steel founders have yet another problem. A good many of the employees in foundries located around Pittsburgh, Chicago and Philadelphia are members of the United Steelworkers of America. Labor trouble could hit them and even if it doesn't, wages are sure to be boosted.

New Freight—Still another bite on the foundry industry is the recent freight rate increase. This hits both coming and going. Cost of taking in supplies goes up and the radius of their sales is effectively shortened by the rate boost.

It hurts a little more in the South where the increase was 9 pct than it does in the North where the rates only went up 6 pct. The total increase in both cases was 15 pct but in the last increase southern railways got only 6 pct while northern roads got 9 pct. Overall effect is to push the dividing line farther south, back to where it was before the last increase.

Portable Baler to Crush Jalopies

More remote auto graveyards unable to invest in a permanent baling installation may be given a boost by this new portable car crusher invented by Carl Miskotten, Coopersville, Mich. Built of I beams, the baler exerts an 80-ton pressure, flattening car shells into bundles of about 9½ ft x 6 ft x 11 in.



SHELLS: Extrusion Vs. Bar Supply

How much more reliance will be put on cold extrusion for artillery shells? . . . This worries steelmakers who feel any big hike would strain bar mills, annealing—*By E. C. Beaudet.*

Just how high bar requirements for the production of artillery shells by the cold extrusion process will reach is fast becoming a matter of grave concern among steel producers. So far the military hasn't made known any definite plans.

But industry officials feel any large scale expansion in shell production by this method would put too great a strain on present bar facilities and annealing equipment. Other military uses for the products of these bar mills are bound to suffer if bars for cold extrusion are substantially increased.

During World War II most shells were made by the hot forging process. In this method a finished bar is not needed and steel can be taken off billet, rail, and structural mills. In cold extrusion the steel should be rolled on a finished bar mill.

Where Demand Lies—The greater part of the present military demand for bars is concentrated on sizes ranging from 3 to 7.5 in. which are produced on 12 and 14 in. mills. These are the same size mills that would produce bars for cold extrusion of 105 mm shells.

However, such mills are already heavily burdened with orders for the fuze plug program and other military requirements. Industry officials believe there is not enough bar capacity to adequately take care of both the shell and fuze plug programs as well as other needs. If the government wants large size bars for other products it can't feasibly go in too heavily for cold extruded shells.

Another important factor bearing on the problem is the question of annealing capacity. Bars for cold extrusion must be annealed before fabrication. Although some cold extruders have annealing facilities, a good many of them do not. This would throw additional strain on annealing facilities at the mills. Some quarters say that the annealing capacity would fall short of requirements.

Onus on Mills—Already the cartridge case program is proving to be a heavy load on the annealing facilities of some steel mills. One steel company is planning to increase its capacity to keep up with the program. Another manufacturer of cartridge cases is said to have been held up 6 to 8 months for lack of annealing space.

While both methods of shell production require high quality killed steels it is said that cold extrusion demands special straightening and more severe conditioning of the steel all down the line, thus putting a greater strain on mill equipment and manpower.

It is felt that a big increase in demand for cold extruded shells would be impractical since hot forgers have adequate supplies of shell steel at the moment. Some reports of inventories of shell quality steel in forgers hands run up to 6 months.

"All right, Funston, so you haven't had a raise in 5 years and living costs are up. Must we follow every fool trend?"

Since present bar facilities are adequate to take care of domestic demand, it is felt that any further expansion of bar facilities which wouldn't be needed in peace time would be foolish. It's said enough shells can be produced by both cold extruders and hot forgers under present conditions.

Other Viewpoint—On the other side of the fence some cold extruders report they have been getting enough bars to support present production. They view the problem as one of degree. It depends on how far the military goes into cold extrusion before any serious bottleneck in bar facilities and annealing capacity takes place.

They point out that it is cheaper than other methods and requires less machining. To overcome some of the problems in cold extrusion, Frankford Arsenal is said to be planning an experimental program.

Army officials have invited suggestions from producers on the elimination of heat treatment or other ways of simplifying the process. One manufacturer of cold extruded shells has been able to eliminate the annealing on 5-in. sizes.

Although third quarter requirements for shell quality steel won't be known until the end of the month, early estimates indicate an increase of 5 pct over the second quarter. However, good sized inventories in the hands of shell producers may result in a reduction of this figure.

Tantalum Production Expansion

Fansteel Metallurgical Corp. has completed an agreement by which the firm will double the capacity of its North Chicago plant for producing potassium tantalum fluoride in return for a guaranteed market for 5 years.

In addition to production of this basic element for tantalum, the new Fansteel facilities will recover columbium oxide from low grade ores and residue.

About $455,000 will be needed to expand the facilities, all to be put up by the company.

OIL: No Shortage Yet in Steel Mills

Trucking and steel production unaffected by the fuel strike . . . Chicago Area hit hardest as only one refinery remains in operation . . . Reserve fuel serves as buffer—*By K. M. Bennett.*

While gasoline shortages grew last week across the nation, steel mills and truck lines seemed to be holding out.

Mills were holding production levels and in a number of cases boasted a good fuel supply, as much as 3 weeks in some cases.

Oil-burning ore and limestone boats continued to operate, and truckers were still able to load up. At Chicago, where the strike had pretty well blanketed output—gasoline and oil seemed to be coming from under flat rocks or via the old underground railway—the truck lines were still operating.

NOT LISTENING: These leaders of the striking CIO Oil Workers Union turned thumbs down on a government request that work continue pending investigation by the Wage Stabilization Board. Shown making announcement at their Denver headquarters are: (left to right) T. M. McCormack, secretary-treasurer; O. A. Knight, president; and B. J. Schafer, vice-president.

The situation had looked bad the week before. Worse, probably, with the exception of two refineries in the Chicago area, all had been knocked out by picketing. Truckers refused to cross picket lines in one of the two remaining refineries, and that, too, went out of action.

Imported Pickets — Picketing then began to affect the bulk gasoline plants as well. One of the Midwest's largest suppliers, with ten bulk plants in the Chicago vicinity, reported six of these surrounded by pickets. It was reported that pickets were being brought into the Chicago area from Detroit.

Chicago's Transit Authority prepared to strike 713 gasoline driven buses from its transport force of 1400 gasoline and propane driven vehicles.

At this point the situation took on an almost enchanted aspect. There was no gas, but trucks continued to run, mills to operate, buses to run. Chicago Transit Authority managed to retain full rush hour service, using its gasoline driven buses only during rush traffic.

Here's why:

Truckers had had ample warning, some as much as 2 or 3 weeks before the strike began. They had tucked away a fair reserve, according to Central States Freight Service Bureau.

Filling stations, at least a number of them, had filled their tanks from a shipment that arrived Wednesday night, after a survey had indicated only an average 2-day supply.

Gasoline was being trucked in from the southern part of the state. City Transit Authority found a fairy godmother in a refinery in southern Illinois that remained open, continued to send shipments that would keep the city buses running.

Switched Fuels—The mills stepped up their consumption of other fuels, went easy on their reserves of Bunker C. They were confident that they could last through several weeks of low supply.

The scene resembled the distribution of a well known home-distilled refreshment of the late twenties. People weren't saying where they were getting the stuff, but getting it they were. A spread of the strike could, however, still hit midwestern industry within a week. Reserves were falling, and these had been the buffer protecting the transportation system thus far.

As of Saturday, May 10, the Illinois Motor Truck Operators Assn. asked that its 1200 members impose a voluntary embargo on shipments in the Chicago area. Chicago was jittery, but not yet gasless.

WSB Wants 11¢ Copper Wage Raise

The 7-month-old wage dispute in the copper industry is back in the hands of company and union negotiators with a Wage Stabilization Board recommendation for an 11¢-per-hr pay increase.

WSB thinks the increase should go into effect immediately, and should be made retroactive to Oct. 15. About 10,000 workers in ten copper and brass companies in Michigan, Connecticut, and Illinois are affected.

Steel Seizure Hearings Start

Supreme Court hearings on the government's seizure of steel mills began in Washington this week. The Court appeared to recognize the grave implications of the case by extending the time allowed for presenting briefs. An unusually large audience was allowed.

STEEL: Union Raises Broad Issues

Prices, wages and union shop in spotlight . . . But many other vital issues are in dispute . . . Union seen invading management's prerogatives . . . Seeks bigger voice in operations.

Public interest in the steel dispute has centered on the issues of wages-prices, and union shop.

But there are other matters just as important that largely have been lost sight of. These issues, too, must be battled out at the bargaining table before a new contract can be signed.

They include (1) management rights, (2) retroactivity, (3) seniority, (4) incentives, and (5) local working conditions. There are many others. John A. Stephens, vice-president-industrial relations, U. S. Steel Co., told the Senate committee on labor and public welfare that the United Steelworkers of America (CIO) "raised well over 100 important issues."

Invasion—The union has been steadily encroaching on management's right to operate the steel plants as it sees fit. Some of its demands this trip would further narrow management's prerogatives.

Retroactivity increases in importance the longer the dispute drags on without settlement. The union is insisting that any agreement be retroactive to last Jan. 1. Last month the industry predicated its settlement offers on limitation of retroactivity to Mar. 1. It still feels that way, perhaps will insist on a later date if settlement is not made soon. Industry's reason is that retroactivity is costly since price increases cannot be made on the same basis.

Seniority is not now the governing factor in determining which worker will be promoted to another job. Ability to do the job is most important. The union wants seniority alone to decide the question. Management favors aptitude.

Wants Both—Incentives have long been a sore point in union-management relations. Management wants to retain the right to install incentive programs unilaterally, on the basis of its own industrial engineering studies, with the union having the privilege of grievance. The union insists on prior agreement. It also wants the right to strike without penalty if it does not consider a unilaterally-imposed plan "fair and equitable."

In the years that the union and the industry have been bargaining, certain local working precedents have been established. The union wants to retain these advantages without regard for conditions laid down in the overall contract. The companies want to eliminate these practices since in many cases they do not bolster efficiency.

No Bargaining—Breakdown of the White House-sponsored negotiations of May 3-4 was due to (1) continued union insistence on all Wage Stabilization Board recommendations, including the union shop, and (2) government refusal to give the industry anything more than the approximate $3-per-ton price increase coming to it under the Capehart Amendment. There was no real bargaining under these conditions.

Chances are the industry might be satisfied with $5.50 per ton on the basis of its latest offer to the union—that is, a wage increase of 12½¢ an hr, plus fringe concessions that would bring the total employment cost to more than 20¢ an hr. WSB recommendations would cost 30¢ an hr by industry estimates.

U. S. Steel:

Irving Olds retires; Fairless is chairman and still president.

Irving S. Olds has retired as board chairman, U. S. Steel Corp. He goes back to his old job—and his hobby—as a member of White & Case, law firm.

STRONG TEAM . . . splits up with retirement of Mr. Olds (right). Mr. Fairless (left) does double duty.

Mr. Olds had no easy job in his 12 years with the corporation. He was lucky to have charge of public relations during the most hectic times in steel history. The experience is one he never would have given up.

Stepping into the chairmanship, but still retaining the title of president of the corporation's operating subsidiary U. S. Steel Co., is Benjamin Franklin Fairless, miner's son, one time civil engineer, baseball player, salesman.

It wasn't too many years ago that Mr. Fairless often made his own spaghetti—express—and mixed his own salad in the kitchen of a Youngstown restaurant where he usually ate lunch. That trait of not losing touch is still with him.

Into a new position—vice-chairman of the board of directors—goes Roger M. Blough, former executive vice-president-law and secretary, U. S. Steel Co. Mr. Blough has run the gamut of investigations and labor fracases—including both the heavier and lighter sides of the law.

DECONTROL: Go Slow on Industry Plan

Industry report gets close scrutiny in Washington . . . Main problems are strike threat, user's views . . . Fourth quarter test planned . . . Keep DO priorities—*By A. K. Rannells.*

Industry's plan for a fast, orderly lifting of controls over steel production and distribution, beginning with fourth quarter, is getting full and serious attention of control officials.

"It is a well thought-out, well considered program," commented Henry H. Fowler, new Defense Production Administration chief. "It has a great deal in common with our own thinking."

Nevertheless, the odds are that industry will not get the rapid action it wants despite DPA's left-handed endorsement. There are two major stumbling blocks.

Wage-Price—One is the tug-of-war over the wage-price question, a three-way controversy between government-industry-labor. Obviously, says Mr. Fowler, the strike question must be settled before any action at all can be taken. Any decontrol move hinges on whether there is a continued flow of steel from the mills.

Also, Mr. Fowler says, he wants to get the reaction of steel users to the proposals. As of last Friday, DPA had not received any comment from consumers nor had the agency officially asked any advisory committees for opinions.

Two Parts—Decontrol recommendations, drawn up by a special task group and unanimously approved by the steel products industry advisory committee, were presented in two segments: (1) The basic plan for lifting all controls and (2) interim steps for putting it into effect.

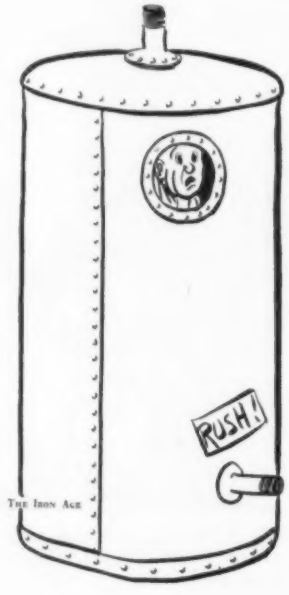
In a nutshell, the fourth quarter would be a trial period during which non-military consumers would be removed from CMP and certain controls would be retained as a "safety valve"; if no disruption shows up during the quarter, all controls would be removed effective Jan. 1.

Under the proposed plan, National Production Authority's production directive system would be continued for the remainder of the year for prime steel products as well as issuance of quarterly CMP allotment tickets for products needed for military and atomic energy programs.

Other defense needs would be taken care of by specific tonnage set-asides of controlled products which would be included in the production directives.

Present provisions for distribution to warehouses and further converters, as well as inventory restrictions on controlled steel products, would also be retained during the trial run.

Minimum Tonnage—In order to prevent unbalanced distribution of decontrolled steel products, a minimum base tonnage figure would be established. Consumers using more than that amount would be limited either to an amount equal to their highest quarterly receipts, product by product, during the period from Oct. 1951 through June 1952 or to a specific percentage thereof.



As far as construction steel is concerned, it is proposed that except for projects covered in Sched. 1 of CMP Reg. 1, all restrictions be removed on jobs requiring less than 500 tons.

As a final step, all controls would be thrown out the window as of Jan. 1 except requirement that military and atomic energy orders must get first place on mill schedules.

One proposed step is the immediate removal of a large number of secondary products from the CMP list.

Officials Agree—Here the decontrol plan is getting on common ground with the control agencies. Officials say that work along this line is already getting underway.

Also, a kind of open-end CMP is proposed by the industry by which any mill space left open at the end of the lead time for placing CMP orders could automatically be used for accepting, scheduling, and shipping of unrated orders.

No restrictions should be placed on the use of this production, the task force said. This would have the effect of increasing the supply of steel available on the open market.

Secret—Here again, a proposal seems to be in line with some DPA and NPA thinking. A hush-hush master decontrol plan, now supposed to be circulating among top controls officials, is said to contain a somewhat similar proposal.

Aware that the proposed program would not be easy to put into effect, and that numerous unforeseen questions and problems would arise during the decontrol period, the industry advisory committee is more than willing to have a task force stay on the job.

Thus, control officials would be in the enviable position of having an efficient, volunteer trouble-shooting organization to assist them in making the transition back to free production and distribution.

NPA Eases Flood Area Controls

National Production Authority last week issued Dir. 1 to M-89 and Dir. 2 to M-6A in order to make controlled materials more available to the Midwest's flood-damaged areas.

Action under M-6A increases the allotments of specific steel products to be delivered to distributors in the area, including standard structural shapes, concrete reinforcing bars, and fence posts.

Under M-89, the new regulation either doubles or triples for retailers in the area the quotas of materials which may be obtained with priorities, depending on procedures used.

At the same time, Defense Production Administration made available an emergency 5 million lb of aluminum.

Industry Controls This Week

Alloying Materials—Amend., Sched. 2, M-80 and Amend. 1, M-80 broaden cobalt controls.

Charcoal—SR 101, GCPR grants a 10 pct increase on hardwood charcoal sales ceilings.

Communications—Amend. M-77 enables small telephone and telegraph operators to self-authorize small construction projects.

Construction—Amend., Dir. 4, CMP Reg. 6 allows water well drillers to include wells requiring not more than 10 tons of carbon steel in their quarterly construction allotment requests.

Diamonds — Price increases are granted to manufacturers of diamond grinding wheels, powder and grinding compound under SR 7, CPR 30.

Flood Area—Dir. 1, M-89 and Dir. 2, M-6A increase allotments of controlled materials to distributors and retailers in the Midwest flood area.

Importers—Importers, wholesalers and processors may file import markups with their OPS District Offices under Amend. 11, CPR 31.

Price Changes—Rev. 1, GOR 18 permits sellers adjudged guilty of antitrust violations because of pricing actions to apply for OPS ceiling adjustments.

Steel—Dir. 11, CMP Reg. 1 lifts ban on steel shipments from warehouses.

Suppliers—Amend. 2, SR 29, GCPR automatically adds suppliers' orders to coverage under SR 29.

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—**Controls**—

Suppliers Included Under SR 29

All suppliers' orders, as issued, will be added automatically to the coverage of Supplementary Reg. 29, General Ceiling Price Reg. This is an interim order applying to wholesalers and retailers pricing under GCPR.

The procedural change was outlined in Amendment 11 to SR 29, effective May 12. It eliminates the necessity for addition of specific suppliers' regulations by number as they are drawn up by Office of Price Stabilization.

SR 29 provides a follow-through at the wholesale and retail level for OPS-approved price increases under suppliers' regulations.

Lifting of Tin Mill Curbs Asked

Suspension of controls over secondary tin mill products appeared in the offing last week as control officials promised to speed up the study of such recommendations made by the tinplate industry advisory committee.

Similar recommendations have been made for blackplate. But, said National Production Authority, this particular product will be included with the overall plan for decontrolling steel and will not be considered separately.

Faster Castings Delivery Sought

Control officials are now trying to work out some sort of priority which would provide a faster delivery to steam turbine manufacturers of heavy castings weighing 10,000 lb or more.

The industry has also complained of lags in deliveries of throttle valves needed for medium sized turbines. It has been recommended that principal valve producers be urged to let out more subcontracts as one means of overcoming this problem.

Emergency Steel Embargo Lifted

Effective May 8, National Production Authority lifted the ban on shipments of steel from warehouses which had been in effect since Apr. 29 on announcement of the steel strike.

Latest Government Appointments

Washington has recently announced the following appointments in defense and related agencies:

John C. Clay, director, Containers & Packaging Div., NPA;

James A. Colvin, director, Engine & Turbine Div., NPA;

Maj. Gen. Frederick R. Dent, Jr., director, Production & Requirements, Munitions Board;

Henry H. Fowler, administrator, DPA;

Fred W. Fraley, deputy assistant administrator, Chemical, Rubber & Forest Products Bureau, NPA;

Col. David W. Heiman, director, Munitions Board Cataloging Agency, Defense Dept.;

Philip A. Hollar, chairman, Transportation Council, Commerce Dept.;

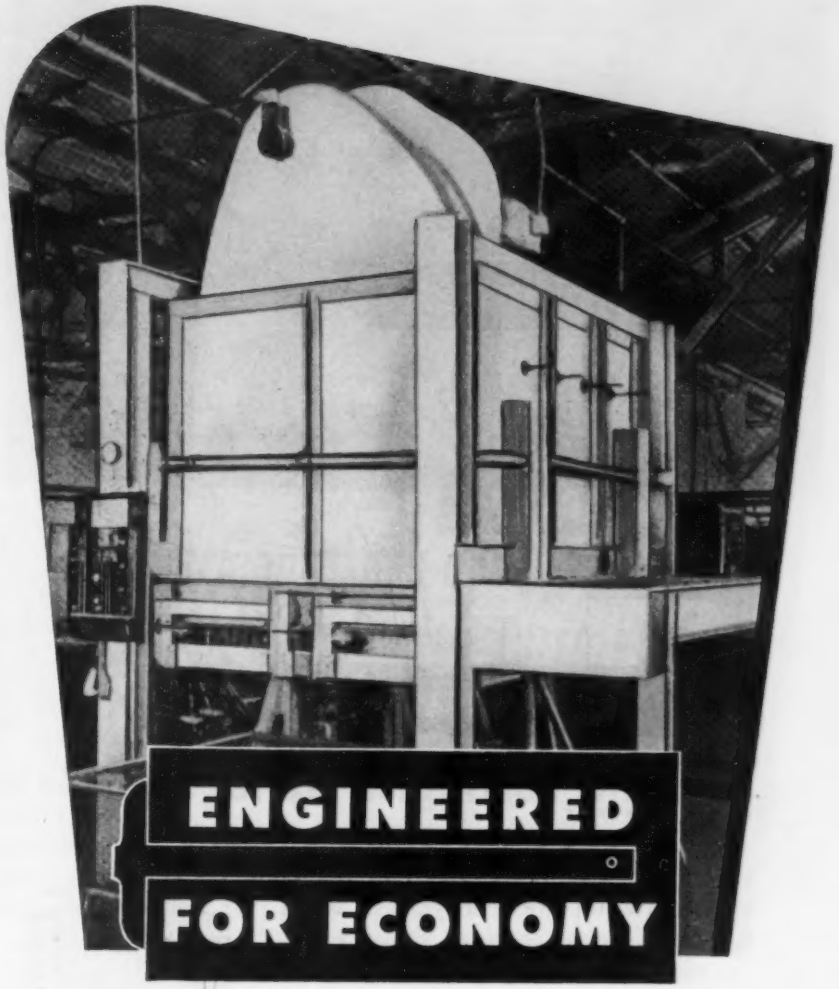
Raymond S. Stimson, administrator, Engineering Service Div., SDPA;

Victor L. Vaughan, industry specialist, Industry Finance Div., DSFA;

Wilford L. White, administrator, Management Service Div., SDPA;

Adolph P. Wunderlich, director, Transportation Div., DSFA.

"Reminds me of the wife."



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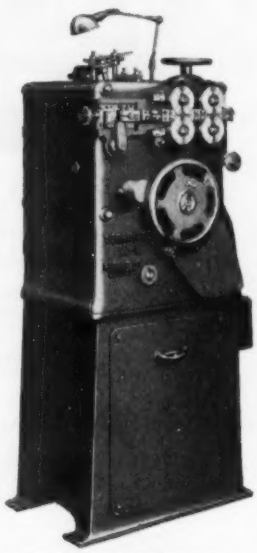
Torrington's 14 different Spring Coilers cover a range of wire diameters from .003" to .750"



MODEL W-11 SPRING COILER

Wire diam. range: .015" to .072". Length per spring: 0" to 42". O. D. Coil Range: 3/32" to 1 9/16". Produces 23 to 190 springs per minute with variable speed drive. Extra wire feed gears, torsion, other attachments available.

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Controls

Can Makers Warn of Price Rise

Increased costs of steel or labor would require an industry-wide ceiling price adjustment by can manufacturers, government price-setters were told recently.

Spokesmen for the industry asked Office of Price Stabilization to begin compiling data for an earnings standard study on which any possible price adjustment could be based.

The industry prices under the order covering general manufactured goods, Ceiling Price Reg. 22.

Price Changes Under Anti-trust

Sellers who have been adjudged guilty of violating anti-trust laws because of pricing actions may apply to Office of Price Stabilization for an adjustment of ceilings, under terms of an OPS order effective May 12.

General Overriding Reg. 18, Revision 1, makes it possible for affected sellers to state proposed new ceilings and their own status in relation to federal court decisions concerning Sherman or Clayton Act violations. They cannot sell or deliver at the new ceilings without specific written approval from OPS.

In the past, some federal courts have ruled that price increases are necessary because existing prices were too low to permit effective competition. GOR 18, revised, was written to prevent sellers from being squeezed between court decisions and OPS standards.

NPA Controls Tool Allocations

Some production difficulties of military contractors may be relieved, Munitions Board Chairman John D. Small says, by the recent transfer from Defense Dept. to National Production Authority of power to allocate idle military-owned machine tools and related equipment. (THE IRON AGE, May 8, 1952, p. 102.)

Transfer also gave NPA the responsibility of maintaining the Production Equipment Central Inventory Group, set up last year as an agency to keep reserve machine tool inventory lists.

Foundry:

Develops novel process to charge borings into side of cupola.

Three British foundrymen have developed a novel means of charging untreated cast iron borings into the side of a cupola furnace. The process and its simple equipment have been in operation on a production basis since last October at Crofts (Engineers) Ltd., Bradford, Yorkshire. Upon the basis of savings realized there, an effort will now be made to sell the idea to American foundrymen.

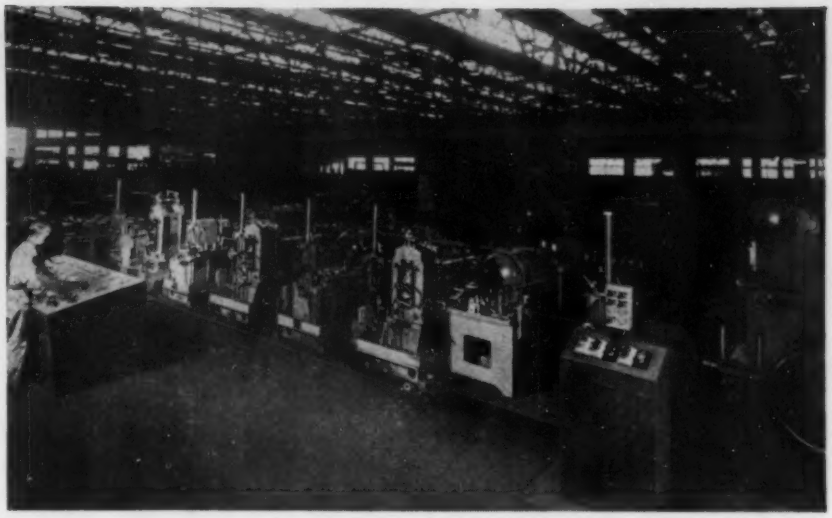
Called the "Crofts Process", it works like this: Turnings are introduced through the sidewall of the cupola just above the melting point. They are forcibly charged by means of a pneumatically operated ram. Charge is made through a special refractory which has a cylindrical hole in it.

Held Down—The main charge of coke, limestone, pig iron and scrap is fed into the furnace by the conventional top charging method. Being above the borings, this charge keeps them from being blown out the top of the cupola by the blast.

Turnings are fed down to the charging device by gravity through a chute slanted at about 45°. The charging ram has a series of fins or lugs on its lower portion which catch the borings and push them forcibly through the opening in the refractory. Heat of about 1000°C causes them to agglomerate quickly and sink into the melting zone. Protective devices keep the charging ram from entering the hot area without a charge, or from stopping at the bottom of its stroke.

Little Loss—At the Crofts works they have been able to introduce borings amounting to as much as 28 pct of the metallic charge, with negligible loss. Charging rate of the ram can be regulated.

Co-inventors of the process are Arthur Croft of the firm bearing his name and his co-director and foundry controller Maurice Goff, and Chief Metallurgist Douglas Hammond.



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In the picture above, you're looking at the new Torrington Flat Wire Mill Line recently installed at American Brass Company's Ansonia plant. The superior features of this Line tell you why American Brass and other leading companies turn to Torrington for the best in Mill Machinery.

CHECK THESE SUPERIOR FEATURES

- Capable of handling up to 3,000 feet per minute, and turning out 50,000 pounds of a size and more per 8 hour day.
- Takes less time for a setup; requires fewer passes to produce finished material.
- Maintains constant, yet adjustable, tension automatically during rolling. Dancer rolls easily added for extremely accurate control of tension and speed on very small wire sizes.
- Spools on payoff and winder are power-loaded and unloaded.
- Entire line may be equipped to stop automatically when desired length has been rolled.
- Each separate unit in entire line is independently motor-driven.
- All rolls are in pre-loaded precision-type anti-friction bearings, with special long-life lubrication built in.
- All gearing is totally enclosed and runs in oil.
- External coolant system for work and rolls; internal cooling on flattening rolls.
- Mill lines may be assembled using 1, 2, 3 or more flattening stands, together with motor-driven edgers in any desired combination of units.
- Works to tolerances as close as .00025" on thickness, .0005" on width.

Torrington's decades of experience, gained from continuous collaboration with the world's foremost makers and fabricators of metal, are at your service to help you put a Torrington Flat Wire Mill Line — or any other Torrington machinery — to profitable use in your plant.

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Any surface, wet or dry, icy, rough or slick.

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The wide variety of Markal Paintstiks makes it possible to correctly mark your products knowing that the mark will be permanent or can be removed when you want it. Temperatures, hot or cold, are no problem as there is a Paintstik for all conditions. Hot castings for example can be marked and immediately immersed in cold water bath without defacing the markings. Paintstiks provide a mark that remains highly legible, adheres to the surface and will not run, char, flow, discolor, peel or crack. Specify Markal Paintstik the next time you order.

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Here are a few of the many uses

- √ Marking hot castings
- √ Marking billets (cold)
- √ Marking cold plates for identification
- √ Marking parts to withstand range of annealing temperatures
- √ Marking steel ingots at 1600°F
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—Defense Contracts—

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address:

Conveyor, drag type, 56 ea, $122,024, Fairfield Eng. Co., Marion, Ohio.

Spare parts, var, $49,353, Caterpillar Tractor Co., Peoria, Ill.

Spare parts, var, $37,505, Waukesha Motor Corp., Waukesha, Wis.

Spare parts, var, $263,952, Barber Greene Co., Aurora, Ill.

Spare parts, var, $42,904, Buda Co., Harvey, Ill.

Spare parts, var, $53,494, Caterpillar Tractor Co., Peoria, Ill.

Spare parts, var, $159,399, Caterpillar Tractor Co., Peoria, Ill.

Spare parts, var, $67,000, Caterpillar Tractor Co., Peoria, Ill.

Spare parts for tractors, var, $474,252, M.R.S. Mfg. Co., Flora, Miss.

Fuze, point detonating, 480,000, $604,800, The Schaible Co., Cincinnati.

Cups, case, brass, 22700000, $14,160,740, Bridgeport Brass Co., Bridgeport, Conn.

Cases, cartridge, 985000, $4,728,000, Globe American Corp., Kokomo, Ind.

Primer, percussion M38B2, 20010 units, $200,100, Automatic Machine Products Co., Attleboro, Mass.

Delay equipt element, 133104 units, $216,294, Automatic Machine Products Co., Attleboro, Mass.

Percussion element, 100000 ea, $34,956, B. A. Ballou & Co., Inc., Providence.

Tool set, 650 sets, $191,633, Lee Eng. Co., Pawtucket, R. I.

Casing, burster, 358300 ea, $147,691, National Silver Co., Taunton, Mass.

Initiator burster, 4630 units, $40,058, Ward Machine Co., Inc., Brockton, Mass.

Automotive parts, $53,400, Diamond T Motor Car Co., Chicago.

Delay element, 144649, $433,513, W. A. Sheaffer Pen Co., Iowa.

20 MM gun, 4200, $255,822, Cline Electric Mfg. Co., Chicago.

Trucks, 2½ ton, $195,413,198, The Studebaker Corp., South Bend, Ind.

Case cups & bullet jacket cups, 31298831 lbs, $13,487, Olin Industries, Inc., East Alton, Ill.

Fin, shell, 81MM M3, 1057000, $412,018, Wilkinson Mfg. Co., Omaha, Neb.

Reel, wire firing 500 ft, 3630, $55,411, Kisco Co., St. Louis.

Spare parts for materials handling equipt, $68,772, Clark Equipt Co., Battle Creek, Mich.

Spare parts for materials handling equipt, $84,700, Towmotor Corp., Cleveland.

Spare parts for materials handling equipt, $52,210, John W. Hobbs Co., Springfield, Ill.

Spare parts for special purpose equipt, $44,781, Michael Yundt Co., Waukesha, Wis.

Replenishment of hardware, 29700 ea, $107,973, Bearings Co. of Amer., Lancaster, Pa.

Replenishment motor vehicles parts, 27075 ea, $124,325, The Electric Auto, Toledo.

Replenishment of tanks & combat, 800 ea, $77,504, Federal-Mogul Corp., Detroit.

Replenishment of motor vehicle parts, 20600 ea, $74,160, New Process Gear Corp., Syracuse.

Replenishment of motor vehicle parts, 5700 ea, $114,685, Reo Motors, Inc., Lansing, Mich.

Replenishment of tanks & combat vehicle parts, 17090 ea, $39,061, Stewart Warner Corp., Chicago.

Replenishment of motor vehicle parts, 7000 ea, $31,220, United Motors Service, Wayne, Mich.

Replenishment of motor vehicle parts, 2500 ea, $25,591, Stewart-Warner Corp., Chicago.

Replenishment of motor vehicle parts, 1000 ea, $48,537, Federal Motor Truck Co., Detroit.

Replenishment of motor vehicle parts, 1760 ea, $255,200, Fontaine Truck Equip Co., Birmingham.

Replenishment of tools, 1440 ea, $83,520, Atlas Industries, Inc., Woodville, Ohio.

Replenishment of motor vehicle parts, 160 ea, $69,592, Federal Motor Truck Co., Detroit.

Replenishment of motor vehicle parts, 10000 ea, $88,992, Dana Corp., Toledo.

Replenishment of motor vehicle parts, 20000 ea, $115,000, S. J. Corbett Co., Detroit.

Replenishment of motor vehicle parts, 25200 ea, $61,368, Truck Seat Inc., Ind., Akron, Ohio.

Replenishment of motor vehicle parts, 42000 ea, $145,720, Bostrom Mfg. Co., Milwaukee.

Replenishment of tank & combat vehicle parts, 1080 ea, $198,720, Active Gear Co., Inc., Chicago.

Replenishment of tools, 505 ea, $186,799, Supreme Equipt Corp., Cleveland.

Replenishment of motor vehicle parts, 85000 ea, $153,649, Carter Carburetor Corp., St. Louis.
Replenishment of motor vehicle parts, 16000 ea, $239,040, The Gear Grinding Mach. Co., Detroit.
Replenishment of motor vehicle parts, 800 ea, $1,013,160, International Harvester Co., Detroit.
Replenishment of motor vehicle parts, 7350 ea, $120,708, Michiana Products Corp., Michigan City, Ind.
Gear, Cal. .45, 307000, $96,091, The H & R Mfg. Co., Cleveland.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

General Stores Supply, Philadelphia.
Locks, swinging door, 2000 ea, 15552Q, 142331, May 20.
Flanges, socket, 7780 ea, 15552Q, 145539, May 20.

District Engineer, St. Louis.
Bucket, fire, 5800 ea, Eng 23-06552-860B, May 14.

Springfield Armory, Springfield, Mass.
Band, rear, hand guard, 170131 ea, 52-275B, May 19.
Ferrule, front, hand guard, 185481 ea, 52-275B, May 19.
Spacer, front, hand guard, 185481 ea, 52-275B, May 19.
Plunger, butt plate, 145826ea, 52-281B, May 16.
Screw, butt plate, long, 168852 ea, 52-281B, May 16.
Screw, front sight, 177806 ea, 52-281B, May 16.
Screw, stacking swivel, 398,969 ea, 52-281B, May 16.
Screw, stock ferrule, 199552 ea, 52-281B, May 16.
Screw, gas cylinder lock with valve assembly, 165014 ea, 52-281B, May 16.
Cover, rear sight, 144548 ea, 52-282B, May 16.
Ferrule, stock, 176527 ea, 52-282B, May 16.
Guide, bullet, 133034 ea, 52-282B, May 16.
Safety, 166293 ea, 52-282B, May 16.
Pinion, elevating, rear sight assy, 181643 ea, 52-283B, May 16.
Screw, butt plate, small, 148385 ea, 52-283B, May 16.
Plunger, hammer spring, 133034 ea, 52-283B, May 16.

Columbus General Depot, Columbus.
Wheel assy, 200 ea, 52-718B, May 16.
Pin, butt plate cap, 149664 ea, 52-285B, May 20.
Pin, follower arm, 152222 ea, 52-285B, May 20.
Pin, hammer, 148385 ea, 52-285B, May 20.
Pin, trigger, 16177 ea, 52-285B, May 20.
Housing, hammer springs, 139430 ea, 52-285B, May 20.
Pin, clip latch, 139430 ea, 52-285B, May 20.

Commandant of Marine Corps, Washington.
Bunks, steel, 32000 ea, 1121B, May 27.
Countersink and drill, 1400 ea, 1063B, May 28.
Drills, machine twist, 600 set, 1063B, May 28.

Ordnance Tank Automotive Center, Detroit.
Padlock, 93000, 52-3496B, May 23.
Cone tapered roller bearing mfrs, 8541, 52-3428B, May 28

Navy Purchasing Office, Washington.
Lifter and scrapper pullers battery terminal, 13600, 4907Q, June 3.
Chasers, thread, 35605, 4861Q, June 2.
Files, 559305, 4895Q, June 3.
Clippers, bolt 4350, 6528B, May 26.
Vises, bench pipe, 804, 4876Q, May 27.
Jacks, automobile, 99295, 6516B, May 29.
Bars, crow, 172790, 6536B, May 29.
Saws, coping, 14900, 6533B, May 29.
Shovels, 14000, 6531B, May 27.
Mine case dolly, 1723, 64910B, May 29.
Cutters, mine sweeping, 7867, 6022S-B, May 22.
Appliers, brake lining, 20555, 4855Q, June 4.
Handles socket wrench, 149375, 6530B, May 27.
Blocks dolly hammers, 11520, 4854Q, June 4.

Watertown Arsenal, Watertown, Mass.
Brake drum and hub assy, 1324, 52-181B, May 19.

Headquarters, Air Materiel Command, Dayton.
Pump assy, 102 ea, 52-829B, May 19.
Tester assy, 300 ea, 52-6516Q, May 19.

ANOTHER SMITH TECHNICAL ACHIEVEMENT

Rotate Tip in any direction *even while flame is burning!*

PLUS THESE EXTRA ADVANTAGES

CHANGE TIPS IN 6 SECONDS

No wrench needed. Fingers do the job. Just insert new tip—spin nut down — that's all.

GUARANTEED service for the rest of your life on all Smith's "LIFELONG" welding torch bodies and cutting assemblies.

THINK what this means in speeding up production schedules and reducing operator fatigue! The average welder is on a stop-and-go basis most of the day — shifting to new positions or stopping to adjust his work — and thus losing production time.

This new Smith Equipment makes it possible to work in the most comfortable and convenient position because the tip can be turned in any direction even while flame is burning. No time out to shut off flame, adjust tip angle or move your work. Just a twist of the finger, or a tap on the side of the tip does the job. It's a time-saver to help you increase production per man-hour and meet production schedules.

NOTE: This feature plus high speed change of tips (in 6 seconds — no wrench needed) is available in the following Smith equipment: Smith's "LIFELONG," MIDLINE and AIRLINE Torches.

SMITH WELDING EQUIPMENT CORPORATION

Manufacturers of fine Welding Equipment for over 40 Years

MAIL COUPON TODAY FOR DETAILS

Smith Welding Equipment Corp.
2633 S. E. 4th, Minneapolis, Minn., Dept. IA-1

Please send me more information on the time-saving and money-saving features of your new torch.

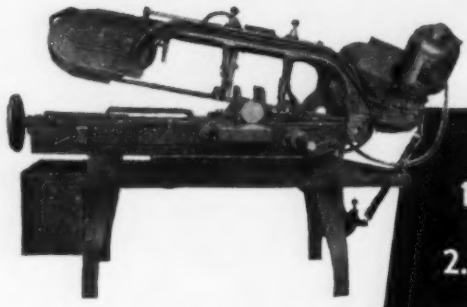
Name_____

Address_____

City_____ State_____

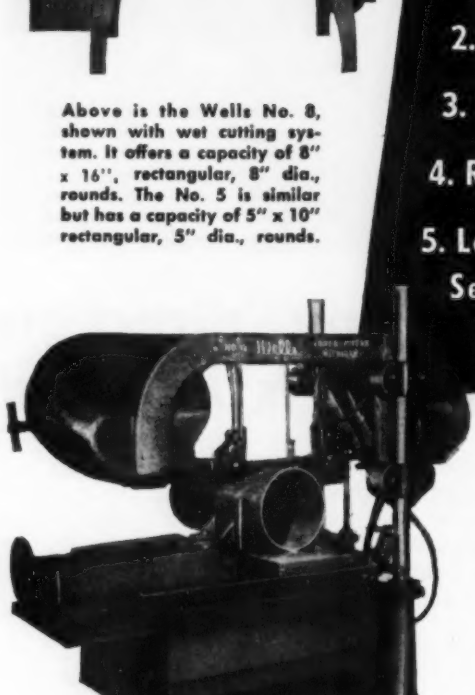
5 BIG REASONS

Why Wells Band Saws slash metal cut-off costs



Above is the Wells No. 8, shown with wet cutting system. It offers a capacity of 8" x 16", rectangular, 8" dia., rounds. The No. 5 is similar but has a capacity of 5" x 10" rectangular, 5" dia., rounds.

1. Fast, Accurate Action
2. High Job Productivity
3. Low Operating Cost
4. Real Blade Efficiency
5. Long, Dependable Service



Left is the Wells No. 12 which features an automatic cutting cycle and controlled blade pressure. It has a capacity of 12" x 16", rectangular, 12¾" dia., rounds. Die block capacity 12¾" deep, 16" wide, 18" clearance bed to blade.

YOU are always ahead when you handle your cut-off jobs on "Wellsaws." The Wells Band Sawing method will not only reduce your operating costs, but also give you greater job efficiency — better cuts, and real dependable service. There is a size and type for every need and every budget. Capacities range from 3½" x 6" to 48" x 48". All models are built for full duty and backed by over 25 years of band saw manufacturing experience.

Your Wells Distributor will be pleased to give you full information on models suited to your needs — or write for descriptive literature.

Wells SAWS

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
202 WASHINGTON AVE., THREE RIVERS, MICH.

—Construction—

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

1725 **Tons,** Northampton County, Pa., bridges, Route 713, for Pennsylvania State Dept. of Highways, to Bethlehem Steel Co., Bethlehem.

760 **Tons,** Lehigh Couny, Pa., bridges, Route 771, for Pennsylvania State Dept. of Highways, to Phoenix Bridge Co.

370 **Tons,** Frankford, Pa., Bldg. No. 41 at Frankford Arsenal, for U. S. Army Corps of Engineers, Perry J. Goldman, low bidder.

190 **Tons,** Philadelphia, junior high school building, McCloskey & Co., same city, general contractor, to Atlas Iron & Steel Co.

Fabricated steel inquiries this week include the following:

2935 **Tons,** Berks, Schuylkill Counties, Pa., bridges for Pennsylvania State Dept. of Highways, bids due June 6.

550 **Tons,** Lehigh, Northampton Counties, Pa., bridges for Pennsylvania State Dept. of Highways, bids due June 6.

240 **Tons,** Salem County, N. J., bridge for New Jersey State Highway Dept., bids due May 20.

Reinforcing bar awards this week include the following:

1200 **Tons,** Ancora, N. J., New Jersey State Mental Hospital, Turner Construction Co., Philadelphia, general contractor.

500 **Tons,** Philadelphia, housing project, 10th and Norris Sts., McCloskey & Co., same city, general contractor, to Bethlehem Steel Co., Behlehem.

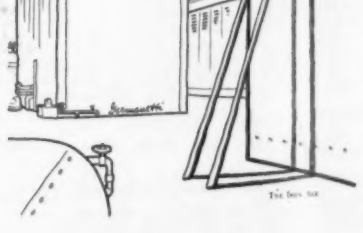
400 **Tons,** Northampton County, Pa., bridge, Route 773, Sect. 2B, for Pennsylvania State Dept. of highways, Wagner Construction Co., Kingston, Pa., general contractor.

400 **Tons,** Vineland, N. J., furnace and tube building, Kimble Glass Co., Hughes-Foulkrod Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem.

300 **Tons,** Whitemarsh Township, Pa., high school building, McCloskey & Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem.

270 **Tons,** Lehigh County, Pa., bridges, Route 771, Sect. 4, for Pennsylvania State Dept. of Highways, Schaller & Hofmeister, East Greenville, Pa., general contractor.

150 **Tons,** Lehigh County, Pa., bridge, Route 771, Sect. 3, for Pennsylvania State Dept. of Highways, C. W. Good, Inc., Lancaster, Pa., general contractor, to Bethlehem Steel Co., Bethlehem.



Structural Steel Curbs Easing

Individual requests by structural steel fabricators for higher inventory ceilings than now permitted will be received and considered by the National Production Authority.

Most requests will be granted. However, officials say that even in face of increasing supplies it is not yet time to raise inventory ceilings across-the-board from 45 days to 120 days as the industry has recommended.

Two other actions are being considered on the structurals front. One is amendment of the regulations to permit the fabricators to use uncashed tickets in the ensuing quarter without coming back to NPA for revalidation.

And definitely scheduled is an increase in allotments of structurals for commercial building for the fourth quarter—providing, of course, that there is no slowdown in production.

Reports to control headquarters indicate that present production rates are 1,400,000 tons per quarter. About 900,000 tons are already going into construction with the remainder set aside for production.

New Coal Projects Authorized

Defense Solid Fuels Administration has authorized 44 new coal mine construction projects since Oct. 29, 1951. Cost is estimated at $28 million. Total of authorized construction is now over 150 projects costing about $165 million.

Projects are primarily for expansion of metallurgical coal production for defense. Latest authorizations complete DSFA controlled material allotments for the second quarter. Fourth quarter application deadline is June 15, 1952.

To Build Humidity Control Units

Contracts to supply humidity control units for 25 large cargo ships have been placed with the Surface Combustion Corp., Toledo. The unit to be used is called the Kathabar.

WYANDOTTE CHEMICALS

Specialists in Industrial Cleaning Products

After 432 hours in salt spray, corrosion has just begun on PRE-Fos-processed steel.

"Phosphating cleaner consumption cut 25%!"

—PRE-Fos field report

And here are more field reports:

"We can run one to two weeks longer before dumping!" "Humidity cabinet resistance improved 80%!" "Best cleaning our washer has ever produced!"

Everywhere users are hailing the unchallenged superiority of Wyandotte PRE-Fos*, the sensational *new* phosphating cleaner that cleans; deposits a fine-grained phosphate coating—an ideal paint base; and prevents rust of in-process steel parts.

PRE-FOS performs in hard or soft water, can be used in spray washer or soak tank and has long solution life. It rinses freely and completely; does not corrode mild steel equipment; reduces sludging.

Read the comparative tests on PRE-Fos and four competitive products, below. Then investigate this great, new cleaner! And be sure to write us for help with *any* of your cleaning problems. We'll be happy to serve you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 54, California.*

CLEANING THE WORLD

*Reg. U. S. Pat. Off.

Product	Hours to failure in salt spray. Panels spray processed 3 minutes, 2 oz./gal., 35 lbs./sq. in. pressure, 160°F. Finished with appliance white enamel and baked; paint thickness 0.0007 inches.	Spray washer cleaning rating. 2 oz./gal., 25 lbs./sq. in. pressure, 160° F., drawing compound and heavy oil soils.	Soak cleaning rating. 4 oz./gal., 170° F., no agitation, mixed and mineral oil soils, 10-minute immersion.
A	failed—408 hours	fair	fair
B	failed—120 hours	fair	fair
C	failed—192 hours	good	good
D	failed—240 hours	poor	poor
Pre-Fos	no failure—420 hours	excellent	excellent

THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorbail. In fact, specialized products for every cleaning need.

Largest manufacturers of specialized cleaning products for business and industry

Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

Helpful service representatives in 88 cities in the U.S. and Canada

Industrial Briefs

Merit Award—In honor of its outstanding improvement in accident prevention the National Safety Council has given the QUINCY SHIPYARD, Quincy, Mass., of Bethlehem Steel Co., an award of merit.

Metals Statistics—This will be the subject of a symposium before the metals section of the Special Libraries Assn. at 2:30 p.m., Tuesday, May 27, at the Statler Hotel, New York. Speakers and topics will be: V. E. Spencer, chief, minerals section, Industry Div., Bureau of Census, "Metal Statistics of the Federal Government"; George S. Rose, secretary, American Iron & Steel Institute, "The Role of Industry Statistics in Modern Business Life"; and George F. Sullivan, managing editor, THE IRON AGE, "Price Statistics on Metals."

Golden Anniversary — THE BURT MFG. CO., Akron, Ohio, will celebrate its Golden Anniversary of incorporation on May 17th with an Open House.

Contract Awarded — WESTINGHOUSE ELECTRIC CORP., Pittsburgh, has been awarded a contract in excess of $1 million to build forced-draft blowers for the Navy's new carrier, *USS Forrestal*. Order was placed by the Newport News Shipbuilding and Drydock Co., builders of the new vessel.

Rigid-Tex Metals — RIGIDIZED METALS CORP., Buffalo, announced that all its rolled metals, ferrous and non-ferrous, will be known and termed as "Rigid-Tex Metals."

Building Completed — A new steel-frame crane building for the Tuschman Steel Co., at 5000 Detroit Ave., Toledo, has been completed by THE LURIA ENGINEERING CORP., Bethlehem, Pa. It is to be used as a steel warehouse and is equipped with an overhead crane with a capacity of 10 tons.

Ahead Of Schedule — CHRYSLER CORP., Detroit, is 2 months ahead of schedule in constructing sub-assemblies for the Douglas C-24 Globemaster II. Major wing and tail assemblies for the plane are constructed at Chrysler's Los Angeles plant.

Appointment — THE ELECTRIC PRODUCTS CO., Cleveland, appointed Robert A. Young & Co., as their Sales & Service Representatives for Southern California and Arizona. Their offices will be in Glendale, Calif.

Consulting Partnership—Dr. Henry M. Paynter and George A. Philbrick, have formed a consulting partnership under the name of PI-SQUARE ENGINEERING CO. The company's headquarters will be at 400 Western Union Bldg., Boston.

Plant Construction — THE CARBOLOY DEPT., General Electric Co., Schenectady, will construct a $3,500,000 plant at Edmore, Mich., for the production of permanent magnets. New plant will house complete manufacturing facilities and will provide room for future expansion and new operations.

Company Formed—POWERS MANUFACTURING CO., Longview, Tex., will be engaged principally in making iron products and, among other things, will produce industrial chains for the U. S. Navy. New plant is expected to cost $4,750,000.

Armor Castings — BIRDSBORO ARMORCAST, INC., a newly-formed wholly-owned subsidiary of Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., is to make hull and turret castings for tanks.

Eastern Headquarters—BAKER INDUSTRIAL TRUCK DIV., Baker-Raulang Co., Cleveland, opened a new Eastern Div. Sales & Service headquarters in New York at 137 Varick Street, recently. They demonstrated some of the latest equipment and methods for modern materials handling.

Name Changed—Firth Sterling Steel & Carbide Corp., Pittsburgh, has changed its name to FIRTH STERLING, INC.

Hydraulic Press Installed—A hydraulic press for the hot extrusion of steel is being installed in the Watervliet, N. Y., plant, Allegheny Ludlum Steel Corp. This press was specially designed by LAKE ERIE ENGINEERING CORP., Buffalo.

Opens Plant—PITTSBURGH PLATE GLASS CO., Pittsburgh, opened a new plant for the manufacture of industrial brushes that will provide additional research, development, and production facilities for the company's expanding power-driven brush operations.

100th Anniversary—SAMUEL SONS IRON & STEEL CO., INC., Brooklyn, recently celebrated a century in the scrap business. The firm is looking forward to continued activity in the coming years.

New Plant—A plant will be built near New Orleans by the AMERICAN CYANAMID CO., New York, for the production of chemicals from natural gas.

"Scrubber" Installation — Nine new "scrubbers" are being installed to wash blast furnace gas at Duquesne Works, UNITED STATES STEEL CO., Pittsburgh. The installation will greatly reduce dust content of furnace gases.

Certificate Awarded—Carl E. Johnson was awarded a FIFTY-YEAR CERTIFICATE in recognition of a half century of continuous and outstanding service in the electrical industry by the National Electrical Manufacturers' Assn.

REVERE BRASS TUBE HANGS UP 25 MILES OF LIGHT

In the General Accounting Office Building in Washington there are luminous indirect fluorescent lighting fixtures which if put end to end would reach across country for 25 miles. This is possibly the most spectacular fact about the installation. So many lighting units are needed in this seven-story structure because it occupies an entire city block and has no court to admit daylight to interior areas. There are 10,000 employees, and large numbers spend all their working hours under electric illumination. The reflectors are made of extruded Plexiglas acrylic plastic, and deliver 90% of the light to the ceiling, from which it is reflected downward, preventing glaring dazzle spots. There are nearly 33,000 lighting units in the building. A Revere man who visited the office reports that the lighting is perfect.

The units or luminaires were made by the F. W. Wakefield Brass Company, Vermilion, Ohio, using Revere Brass Tube for the hanger stems. At one end the tube had to be threaded for a length of two inches and flared at the other. The stem is then chrome-plated. Brass lends itself ideally to these operations. Revere will gladly collaborate with you on the specification and fabrication of Revere Brass.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

Dealers Celebrate Death of Reg. W

Salesmen look to easier credit to boost lagging sales . . . Joy not universal . . . Independents had most sales troubles, were main opponents of restrictions—*By R. D. Raddant.*

Scrapping of the much-hated Regulation W has evoked sheer jubilance from automobile dealers.

Confronted with a stubborn buying public and a failure of the spring sales boom to materialize, sales people looked for easier buying terms to bring prospects crowding into their showrooms. "It will give the car business a shot in the arm," became an overworked expression from salesmen throughout the industry.

Most companies issued statements ranging from genuine enthusiasm to more cautious approval of the Federal Reserve Board's decision. But there were those who feared the inflationary aspect or thought it unnecessary with auto production still controlled.

Some Opposed — Dealers had pressed for some time for a relaxing of Reg. W's strict terms. But the Automobile Manufacturers Assn. only recently stepped in to favor easier credit buying. There is considerable evidence that this decision was not unanimous in the industry.

General Motors top management had previously gone on record as opposed to too-lengthy credit buying. Eagerness to get Reg. W lifted was concentrated among the independents who were encountering the most sales trouble. Bigger producers felt that more aggressive sales techniques would take any softness out of the market.

Output Still Controlled — In spite of the poor sales records so far in 1952, sales still kept pace or ran ahead of production which is still tightly controlled. Even though the credit was completely lifted from automobiles, it is doubtful if terms would be greatly changed.

Under Reg. W, a down payment of one-third with 18 months to pay was required. New terms of a down payment of one-fourth selling price with 24 months to pay probably will prevail in the new market.

Probably the "shot in the arm" term will definitely apply to the used car business. In the used car market, few sales are made with trade-ins to take the place of a down payment and the strict controls on credit extension had a more serious effect on sales. Lifting the regulation was hailed up and down Livernois Avenue as the greatest news in months.

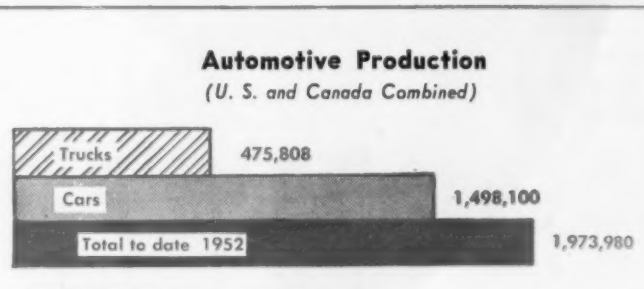
Color Trim — Aluminum manufacturers are ready with color trim for passenger cars whenever the automotive stylists are ready to use it. One new model, Nash, uses a colored aluminum extrusion for window trim. One difficulty is that organic dyes tend to fade. However, metallic dyes hold color and can be used successfully.

Strike Threat — A new threat, although certainly a temporary one, to auto sales is the gas strike which threatened to paralyze auto traffic throughout most of the country.

Some of the producers of low mileage cars were quick to take advantage of the situation, however. Nash Motors, in a lightning advertising maneuver, quickly placed 1500-line ads in the 80 largest papers in 63 cities.

High Compression—Automotive engineers are constantly working toward increasing the compression ratios in auto engines. C. L. McCuen, general manager of GM Research Laboratories, points out that a ratio of 12 to 1 could improve fuel economy by 30 pct with annual savings of $2½ million to car drivers.

Automotive Production
(U. S. and Canada Combined)



WEEK ENDING	CARS	TRUCKS	TOTAL
May 10, 1952	102,048*	29,386*	132,434*
May 3, 1952	100,895	27,490	125,385
May 12, 1951	123,721	34,781	158,502
May 5, 1951	122,365	32,158	154,523

*Estimated

Source: *Ward's Reports*

COMPETITION: Still Plenty There

Ford's try for revised production quotas stirs arguments among automakers . . . Chrysler is most vehement objector . . . Ford claims its quotas should include new plant facilities.

The competitive spirit has appeared lacking in the automobile industry under government controls. It flared out in, of all places, Washington, before the National Production Authority.

William T. Gossett, Ford general counsel, charged that under the present production quota system, "the competitive clock has been set back to the middle of 1948."

The issue was Ford's appeal to revise the automobile quota base period from 1947-1949 to the year ending June 30, 1950. All competition with the exception of General Motors filed objections to Ford's appeal. Loudest objector was Chrysler which would be dropped from second place in the industry under the Ford plan.

"The competitive race in the automotive industry is run on a fast track," Gossett declared. "Positions can change, and have changed, rapidly."

Internal Changes — Ford contends that during the NPA base period, Ford was undergoing vast internal changes following abdication of the late Henry Ford in favor of his grandson.

During the period Ford spent hundreds of millions expanding its plants and equipment and in engineering developments. The company argues it should be given a quota based on the results of this program rather than the average of the period leading up to its completion.

In answering the charge that the Ford program would seriously injure the independents, Ford said that in the past 9 months, of the independents, only Studebaker managed to make use of all allotments of metals.

Undeserved—But what appeared to hurt Ford most was Chrysler's previous statement that Ford was attempting "to create for itself under government controls a standing in the industry its own efforts have not brought it."

"I do not want to quibble with my friends at Chrysler," Gossett stated, "but if they will add up the total production of passenger cars since the end of World War II, they will find Chrysler is in third place, not second place."

Apparently to the automobile companies, as to individuals, position is everything.

Auto Production Rate Climbing

Auto production has now risen to creditable rates and several major companies are planning overtime in the next month. However, Chrysler and General Motors are planning new model introductions earlier than usual and will probably drop below quota figures when changeovers come in the fall.

In April, production of passenger cars in the U. S. and Canada totalled 444,633 against 536,516 in the same month of 1951. This shows that production rates are approaching those of a year ago although the cumulative figures are far behind the 1951 records.

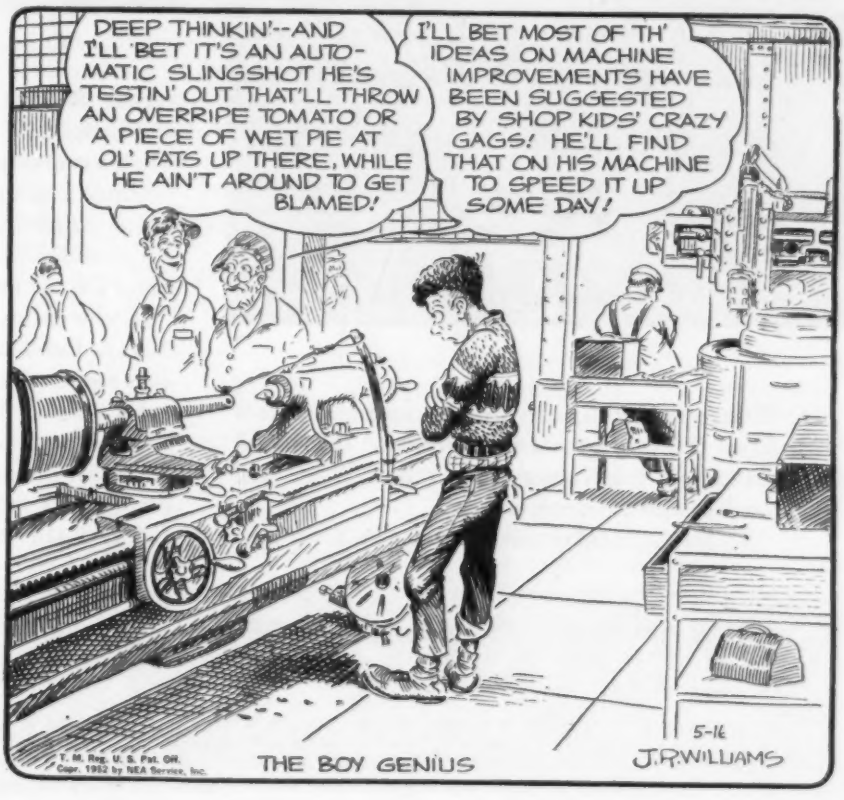
Production of all vehicles for the first 4 months of 1952 totaled 1,973,980 against 2,803,536 for the same period a year ago.

GM Engine Has High Compression

General Motors claims it has the "best power-to-weight ratio ever achieved in the trucking industry" in its new GMC truck engine.

The 302 cu in. engine has a compression ratio of 7.2 to 1, highest of any standard gasoline engine. It generates 145 gross brake hp. The new engine will be placed in GMC 450 and 470, 2½- and 3-ton model series trucks and tractors.

THE BULL OF THE WOODS — By J. R. Williams


DEEP THINKIN'--AND I'LL BET IT'S AN AUTOMATIC SLINGSHOT HE'S TESTIN' OUT THAT'LL THROW AN OVERRIPE TOMATO OR A PIECE OF WET PIE AT OL' FATS UP THERE, WHILE HE AIN'T AROUND TO GET BLAMED!
I'LL BET MOST OF TH' IDEAS ON MACHINE IMPROVEMENTS HAVE BEEN SUGGESTED BY SHOP KIDS' CRAZY GAGS! HE'LL FIND THAT ON HIS MACHINE TO SPEED IT UP SOME DAY!
T. M. Reg. U. S. Pat. Off. Copr. 1952 by NEA Service, Inc.
THE BOY GENIUS
5-14
J.R.WILLIAMS

PROTECT THESE BEARINGS

...Assure clean circulating systems with TEXACO REGAL OIL

When oil film roll necks are lubricated with *Texaco Regal Oil,* they get the full protection that means uninterrupted operation, longer bearing life and lower maintenance costs.

Texaco Regal Oil is turbine-quality for heavy-duty service. Because it resists oxidation, emulsification and sludging, it keeps the circulating system clean. Thus, a constant flow of cool, clean lubricant to the bearings is assured; and the tough film of *Texaco Regal Oil* carries heavy loads easily under all operating conditions. There is a complete line of *Texaco Regal Oils* to meet all requirements.

In your enclosed reduction gear drives, use *Texaco Meropa Lubricant.* It has extra oxidation resistance, does not foam, assures longer gear life.

Let a Texaco Lubrication Engineer help you keep all your machinery at top efficiency. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Regal Oils
(HEAVY CIRCULATING OILS)

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

Improve on Stockpiling Methods?

One office now handles both allocations and reserves . . . Intended to stop Pentagon haggling over materials . . . Knowles, former DPA assistant, heads new unit—*By G. H. Baker.*

An important new approach to the 12-year-old problem of stockpiling for national defense is about to go into effect at the Pentagon.

This switch in Munitions Board thinking on the relationships between allocation of scarce materials for immediate use and allocation for stockpiling purposes has escaped public notice behind a recent and obscure announcement: "Office of Vice-Chairman for Stockpiling Program has been redesignated Office of Vice-Chairman for Materials."

Significance of this move is the centering of two key military functions within one office. The Munitions Board's Office for Materials now wears two hats. One is the responsibility for final decision as to how available supplies are to be divided among the Army, Navy and Air Force. And, at the same time, the same officials also will decide how much available material is to be stockpiled.

Stop Fights—Move is calculated to end haggling between various offices over how much copper, for example, should be earmarked for immediate production, and how much should be put aside for future contingencies.

Nathaniel Knowles, former assistant to Defense Production Administration Chief Manly Fleischmann, heads the new combined operation.

Military planners of industrial production base their estimates on the fact that the process of translating operational plans into resource requirements involves a long cycle of interlocking calculations. These must be supplied by the Army, Navy, Air Force, Joint Chiefs of Staff, the Munitions Board, comptrollers of the Defense Dept. and its three services, and DPA.

The cycle is not only long but continuous, since day-to-day changes in strategic planning necessarily result from changes in national policy and in the international situation.

Costs Little—The small handful of government employees who are running the steel industry during its seizure now claim that the actual additional cost to the taxpayer of government operation is so small as to be unworthy of attention.

There have been no additions to the government payroll as a direct result of government operation, they state. Actual administration of the industry is being conducted by Secretary of Commerce Charles Sawyer and a new office in the Commerce Dept. labeled "Organization for Steel Industry Operation" (OSI). The new office thus far consists of eight full-time employees borrowed from other agencies, plus five secretaries.

W. H. Wiewel has the unprecedented but thankless job of administering the affairs of the new OSI. He is on loan from National Production Authority, and is otherwise fully occupied as vice-president, Crucible Steel Co.

More Planes—Recent gains in tooling-up for production of military aircraft are instilling new optimism among sea-going planners of air operations.

By this time next year, according to U. S. Navy calculations, assembly lines will be turning out about 300 planes for the Navy each month.

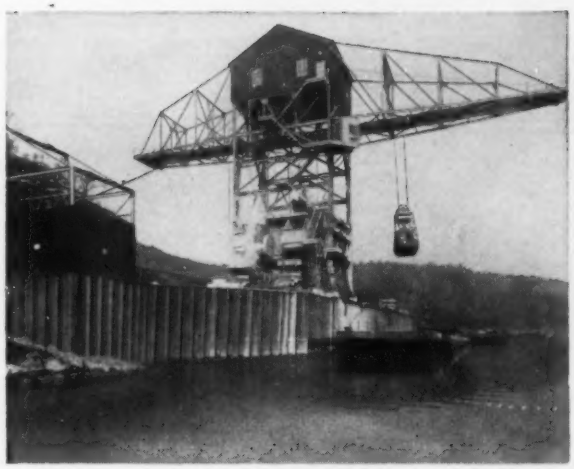
This stepped-up output will include at least seven models which are rated as superior to Russia's MIG 15 jet fighter.

Another new type is an all-new, long-range fighter plane which will be capable of delivering small atomic bombs. Attack-type planes capable of carrying large-size atomic bombs are already in operation on certain carriers.

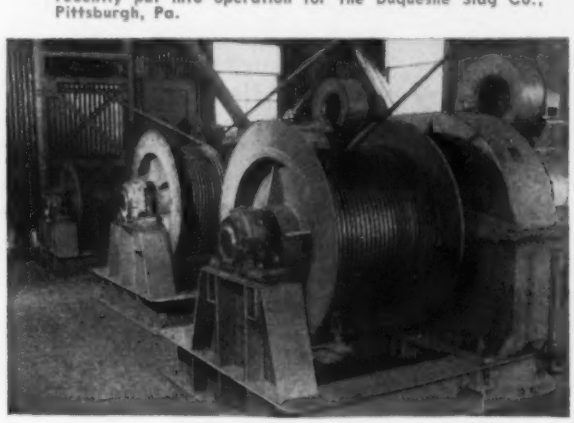
Mixed Blessing—Suspension of government controls over installment buying is regarded as a mixed blessing at the Capitol.

Fact that the curbs have been merely suspended, and not terminated, means that the Federal Reserve Board can clamp controls back at any time.

How this uncertainty will affect buyers' habits and automobile dealers' inventories remains to be seen over the next few weeks. It is believed in some government circles that the threat of sudden or unannounced return of Reg. W (Federal Reserve Board's consumer credit rule) will cause many dealers to be wary of loading up heavily with inventories of new cars. When Reg. W became effective about 18 months ago, many dealers suddenly found their assets tied up in big inventories and few customers in a position to get up the necessary one-third down. (For Detroit's view, see p. 86.)



This 720 ton-per-hour Barge Unloader . . . designed, fabricated and erected by Heyl & Patterson . . . was recently put into operation for the Duquesne Slag Co., Pittsburgh, Pa.



The Close Drum and the Hold Drum (right and center), which raise, lower, open and close the bucket, are operated by two 200 H.P. motors. The Trolley Drum (left) is operated by one 100 H.P. motor.

All motions of the Trolley and Bucket are easily controlled by a single operator.

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Every man on our Sales Staff is an experienced, practical engineer with a firm belief in the need of advanced design. Their first duty is to understand your problems. Then it is the duty of every member of the H&P organization to see that you get complete cooperation . . . all the Way, from the original design to the successful operation of your equipment.

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STEEL: Big Plans for German Output

MSA plans German production of 20 million tons, capacity of 23 million . . . Will cost $600 million if Congress approves . . . Approval of other European steelmaking nations doubtful.

Mutual Security Agency is now blueprinting the German steel industry's most phenomenal postwar expansion. Sights are set at 20 million tons production with a capacity of 23 million tons. Other European steelmaking nations, watching the industrial rebirth of a traditional enemy and strong competitor, may not fall in line with the Washington plan.

An MSA breakdown of 1951 German steel distribution showed that 8 million tons went for domestic use, 2 million tons for export, and 3.1 million tons into defense. Under existing arrangements among western powers, any increase in German steel output would go into defense. But European producers are bound to consider that after the emergency is over Germany would have a first class steel plant to devote to its own purposes.

FILLING HIM IN: Manly Fleischmann (left), Defense Production Administrator, briefs Henry H. Fowler, National Production Authority chief, on his new duties. Mr. Fowler will take over DPA when Mr. Fleischmann resigns May 31.

In 1951 the German steel industry made 13.1 million tons of steel as original Allied limitations were raised to counter the Soviet threat. If MSA's plan wins out, West German steel output and capacity will rival that of the whole German nation before World War II. Germany may take the dominant position in the Schuman plan to pool steel resources.

Where Steel Went—Cost of the expansion is set by MSA at about $600 million. Those parts of the program not requiring dollar expenditures would be financed with counterpart funds. The rest would take American aid under the Mutual Security Pact.

German Losses—Overall prewar capacity of Greater Germany was estimated at 23 million tons with immediate prewar production set at 16 million tons. War damage wiped out several million tons of capacity; some 2 million tons fell into the Soviet zone; and about 6.7 million tons were lost through dismantling and reparations.

In 1946 Germany produced 2.6 million tons of steel but by 1949 output had spurted to 9.1 million tons and in 1950 it climbed to 12.1 million, exceeding original Allied limits. In 1950 the Red menace prompted the Allies to permit further production—provided it went to European defense.

MSA has set no time limit on German expansion. Before anything can be done, money must be appropriated from Congress, which is getting weary of helping Europe. Approval must be granted by the other western powers.

Steel Case:

List possible avenues of Supreme Court decision . . . How USW stands.

Within the next 3 weeks, the Supreme Court is expected to announce a decision on the steel dispute.

Barring the outside possibility that the Supreme Court will put over until next fall the question of legality surrounding President Truman's seizure of the steel industry, there are three basic choices available to the court between now and its scheduled adjournment date of June 3:

(1) The case may be returned to the Circuit Court of Appeals for decision.

(2) The Court may rule on one of the narrow issues involved in the case, such as whether or not a state of emergency actually existed or whether Mr. Truman had the authority to delegate operation of the mills to Secretary of Commerce Sawyer. The logic here is that the Court may not wish to tie the hands of future Presidents in acting in emergency by setting a broad precedent now.

(3) The Court may announce a far-reaching definition of the seizure powers—or lack of them—that are delegated to the President.

Should the Court outlaw seizure, it is believed that Mr. Truman still has several unexplored avenues of action available to him. For one thing, he may decide to set up a board of prominent citizens to hold new hearings on the dispute. Or, he may toss the whole wage-price problem to Congress with a request for special legislation covering the questions of seizure, price control standards, and wage control standards.

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Industrial Expansion Continues

First Japanese company since Pearl Harbor incorporates in California . . . Employment boom shows no signs of slackening . . . Aircraft leads, electrical goods next—*By T. M. Rohan.*

On the heels of the Allied letup of control over Japan, Nippon's largest importer-exporter of iron ore and steel set up shop on the Pacific coast last week. Articles of incorporation in California were filed at Sacramento by Kinoshita and Co. Ltd., U. S. A., the first Japanese corporation to be formed in California since Pearl Harbor.

The California firm will be affiliated with the Toyko firm of the same name. It will handle Nevada iron ore exports and import of finished steel products from Japan.

Lower grade ores have been shipped to Japan steadily for the past 2 years. The new corporation will formalize the arrangement and bring certain economic advantages. Cheap labor costs, of course, offset high transit costs and permit more profitable exploitation of low grade ore.

Boom Continues — Aircraft workers in the Los Angeles area led all other business in increased employment since the outbreak of the Korean war. Over 148,000 new workers and 60,000 from unemployment rolls have been added.

Aircraft increases totalled 106.3 pct followed by electrical machinery with 102 pct and shipbuilding 100 pct. In total employment, government workers including federal, state and local ran close behind retail trade and service employment.

In San Diego, 122 miles south, total employment skyrocketed to 11,000 more than the World War II peak of 195,000. Over 22,000 have been added in the last 12 months.

More Jobs for Seattle—Expansion plans of the Colotrym Co. of Seattle, largest western manufacturers of metal moldings, were greeted with joy by civic and labor officials. The state's aluminum industry has traditionally used a large share of the hydro-generated power and a minimum of employment. The product has gone East for manufacture.

The new $1 million Seattle plant will produce aluminum moldings and extrusions. A large press has been acquired and operation is expected by fall.

Air Force Building—Union Steel Co. of Los Angeles was low bidder for $401,472 worth of structures for the new $6.5 million U. S. Air Force facility which will be built adjacent to the Boeing plant in Seattle. Boeing will act as contractor for the buildings which will include a 922 x 422-ft material preparation plant and 122 x 422-ft maintenance shop.

ALARM: William S. Sprague, Waldrip Engineering Co., Los Angeles, holds two models of his new air raid and flood alarm. Device works when frequency of house current is varied.

Underground Parking—Los Angeles' Pershing Square, traditional gathering place for soapbox orators, has been undermined with a $5 million, 3-level underground parking garage. The 800-car unit used 2985 tons of reinforcing steel, 46 tons of structural steel, 60 tons of miscellaneous types and 300,000 sq ft of reinforcing steel mesh. Over 230,000 cu yds of earth were removed.

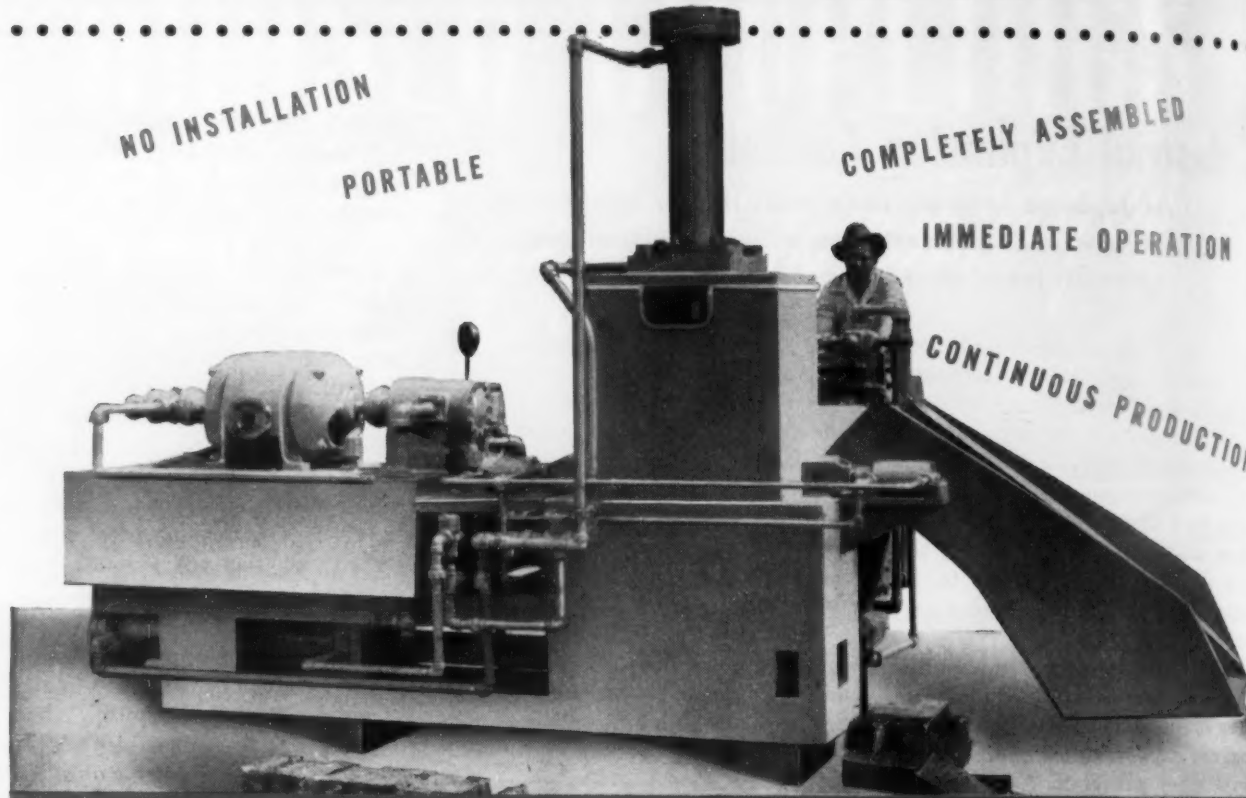
Everybody's Happy—Coal miners in Dragerton, Utah, are finally happy about their hospital. When hospital officials and United Mine Workers had become embroiled over its administration the union boycotted the place, practically closing it.

With no assurance of good treatment in case of injury, many miners refused to work. U. S. Steel didn't want to go in the hospital business; neither did the neighboring Kaiser mine. UMW didn't know what else to do, so they called a strike.

To get things going again, U. S. Steel bought the hospital and presented it to the Permanente Foundation, a non-profit hospitalization plan. Last week the miners had their hospital, the mines were running, UMW was off the hook and all was peaceful in Dragerton.

Save Metals — Nonferrous and light metal conservation has been an indirect result of Los Angeles' intensive 4-year anti-smog campaign, reports the Bureau of Mines. Plants producing these metals installed small bag houses over furnace outlets to cut down air pollution. Result: less pollution, and plants discovered dust captured in the bag houses could be processed into useful metal.

Harris Non-Ferrous Metals Baling Presses

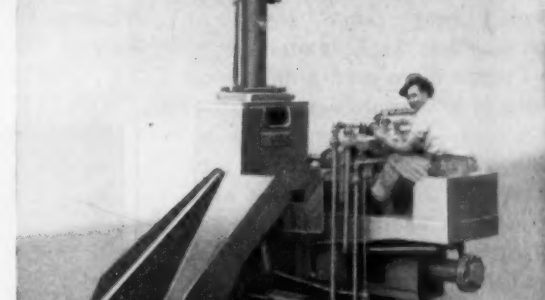


Bundle Size Attracts Dealers and Smelters

The HARRIS Non-Ferrous Metals Baling Presses were designed primarily for use in baling non-ferrous scrap. A particular feature of this design is that continuous baling is obtained, since the charging box is open while the bale is being made and ejected. The charging box is large enough to handle bulky material such as wire, sheets, etc. Pressures used make an exceptionally dense bale—approximately 40% density.

Dealers find these presses excellent also for baling sheet iron clippings and tin cans. The size and density of bundles are especially attractive for charging in electric furnaces.

The three models of this design provide an ample range to meet all requirements.

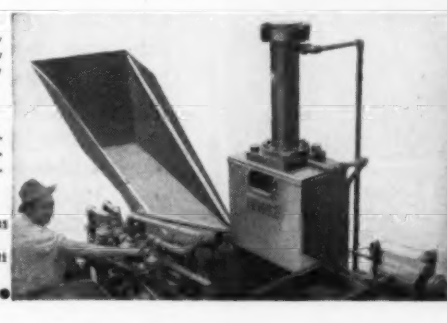


Size of Charging Box	33" x 33" x 24"	Vickers Vane Type Rotary Pump	2,000 lbs. per sq. in.
Average number of bales per hour	60 - 70	Space Required	10' x 12'
Size of Electric Motor	50-Hp. 1200 Rpm	Shipping Weight	20,000 lbs. (approx.)

AVERAGE SIZE OF FINISHED BALE	
NF-40	5" x 5" x 15"
NF-50	5" x 7" x 15"
NF-80	8" x 8" x 15"

AVERAGE WEIGHT OF BALE	
NF-40	40-60 lbs.
NF-50	50-70 lbs.
NF-80	80-100 lbs.

AVERAGE TONNAGE PER HOUR	
NF-40	One and one-half tons
NF-50	Two tons
NF-80	Two and one-half tons



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Stake Your Claim in Minerals Hunt!

New deposits break out all over . . . Even in middle of thickly populated areas . . . Where there's smoke there's fire in case of farm land buying . . . Locate iron ore — *By F. Sanderson.*

New mineral deposits are breaking out all over in Canada. Almost every week brings to light a new discovery in some section of the Dominion. As information leaks out there is a quick rush of prospectors into the new area. Canada's mineral wealth is not confined to the remote areas.

It seems to be everywhere and recently rich discoveries have been made on the outskirts of cities and towns and sometimes smack in the middle of thickly populated areas.

To Plant Potatoes?—For several months past certain financial interests have been quietly buying up farm lands. The area extends over 5 miles in length with a width of 2 miles, bounded on the North by the town of Simcoe and extending south to Port Ryerse on the North shore of Lake Erie.

Options have been taken on farm lands at $100 an acre per year and purchase prices have run upward of $1000 an acre. It's estimated that more than $600,000 has been paid out in options.

Deep Freeze Secret—What information is available indicates that Canadian and American steel companies are associated in the deal. But when approached Canadian steel interests deny participation. Both Steel Co. of Canada, Ltd., and Algoma Steel Corp., have been mentioned in the deal, but officials refuse to confirm.

Bethlehem Steel, which has been carrying out extensive exploration work in the Marmora district of Ontario also is said to be in the picture. Again no confirmation.

Ore Below—Geophysicists have just completed a magnetometer survey of the area and located a magnetic irregularity pointing to possible existence of a magnetic iron deposit in the Precambrian rocks under 3000 ft of sediments. The scientists found an area of unusual intensity which is a good bet for exploration.

This omen of iron ore first was located by a survey made by the Ontario Dept. of Mines while searching for oil and gas in the area. Steel interests say there is a possibility the anomaly indicates a magnetic iron deposit similar to that at Morgantown, Pa., found by Bethlehem Steel to contain over 100 million tons.

Why will a magnetic iron orebody in this area prove extremely valuable? It is near Lake Erie and this means low transportation costs. Savings in hauling would far more than offset the cost of developing an orebody at the depth indicated.

JUMBO: Stripping a large ingot from its mold at Dominion Steel & Coal Corp.'s Sydney, Nova Scotia mill.

Sleeper Awakes — Dormant for almost three decades, the Cobalt mining area of Ontario, once famous for its rich deposits, has again come to life. Some 4 years ago the camp was revived when the price of silver reached a profitable mining level.

This area has a reputation for its cobalt deposits. But in the early days this metal was considered a detriment. Cobalt ores were mostly discarded on dumps and only limited quantities were used.

Today cobalt is one of the strategic metals in the jet and atomic age. The price has moved up to make mining profitable.

What's Being Done—The drive to produce cobalt and other metals has resulted in arrangements for establishment of a modern cobalt-silver smelting and refining plant at Cobalt. It will be under the technical direction and management of Quebec Metallurgical Industries, Ltd., which is controlled by Ventures and Frobisher. Quebec Metallurgical has been developing a method for treatment of cobalt ore. Pilot plant operators are continuing at Ottawa.

The new interests will use the Cobalt Chemical & Refining Co., Ltd., plant which was damaged by fire in 1950 and has been idle since. Products to be turned out include pure silver, cobalt and nickel in marketable forms and copper residues. Cobalt will rank highest.

Keep Hunt Alive—Eldorado Mining & Refining Co. (government-owned) has extended its buying of radioactive ores to Mar. 31, 1962. Few genuinely important finds have been made in the past few years despite intensification of the hunt for uranium. Several companies have nevertheless announced plans for production with only limited work completed.

Will the Treasury Change Its Mind?

NMTBA hopes for changes in depreciation regulations . . . Asks writeoff periods determined by individual needs . . . Pressure put on Congress to force end of TD 4422—*By G. Elwers.*

The machine tool industry has never been noted for over optimism. So it is significant that several officials of the National Machine Tool Builders' Assn. have recently indicated they are not entirely pessimistic about revising the Treasury Dept. attitude on depreciation.

The industry has been bringing big guns to bear on TD-4422. This Treasury regulation sets the time allowed for writing off a machine tool. Average writeoff time is close to 20 years, except, of course, where fast tax writeoffs are allowed.

Cuts Replacement — Tool builders believe this excessively long writeoff period discourages frequent replacement of machine tools by newer, more productive models. Aim is not merely to have the period shortened, but to obtain complete removal of TD-4422. With little chance felt of the Treasury's giving up TD-4422 voluntarily, the campaign has been directed toward Congress to get support from another quarter.

As Needed—Machine tool builders want capital equipment written off as fast, or as slowly, as individual situations indicate. Circumstances differ. Sometimes it may be desirable to spread the depreciation over a long period, but it is unfair and unwise to force the long period on everybody, it is reasoned.

Short writeoffs would encourage more frequent replacement, NMTBA members feel. They are backed up by many other industry associations. It would provide more peacetime business for machine tool builders. Thus it would be a major step toward the government's goal of keeping the industry strong as a defense measure.

More Profits, More Taxes—The contention is that the removal of TD-4422 would be of benefit to the nation, since more productive and more efficient industries earn more money and thus they can pay more in taxes.

Many foreign countries, notably Sweden, Canada, and Great Britain, have much more liberal tax writeoff on capital expenditures than does the U. S. Even under the Labor Government in England a writeoff of 40 pct was allowed in the first year, and complete writeoff in about 5 years.

In this country, TD-4422 was never intended to be more than a temporary measure. It was put into effect in early New Deal days to jump up the immediate take in taxes from corporations.

Nobody contended at the time that it would bring in any more tax money. It was just intended to bring it in sooner.

Not A Loss—But whenever removal of TD-4422 was brought up, the Treasury has laid great stress on the amount of tax money it would lose in the next year, as though this would be an out-and-out loss. Loss has been estimated as high as $6 billion.

Nothing can be expected from Congress in an election year, but machine tool industry leaders feel they are making a favorable impression on Congressmen who count and who probably will be around next session.

No News—First meeting of the new Production Policy Advisory Commission was held in Washington last week, but nothing in the way of official news resulted.

Only two names have been announced so far as members of the commission: Harold S. Vance and Clay Bedford. After Friday's meeting, Clay Bedford's office said it had no announcement on the names of additional Commission members.

Electronic Cutter—A warehouse mechanized flame-cutter guided by a photoelectric cell has been installed in the Joseph T. Ryerson & Son warehouse at Seattle.

A black and white drawing can be used as template. The electronically guided cutter gives clearcut corners, but can be used in cutting involved shapes using only an inked silhouette as guide. Though already in use in the Midwest and East, this type of flame cutter has not been put into any extensive use on the West Coast.

Along with the flame cutter, a plate shear with a capacity of ¾ in. by 8 ft has been installed.

"I was thawing out a frozen water pipe with a torch, but got too close to a gas pipe by mistake!"

The Iron Age

SALUTES

F. Guy White

Imagination and ability make this energetic scientist and executive a galvanizing industry leader.

DRIVE and enthusiasm have marked Guy White's rise to technical director of Granite City Steel Co. Doffing Navy blues after the First World War, Guy (a born New Yorker) left Montclair, N. J., and followed Horace Greeley's time-honored advice as far as Illinois. He landed a job as chemist in the steelworks of National Enameling and Stamping Co., forerunners of Granite City. Apparently he liked the work, for he's been there ever since.

Guy's first step up was his reorganization of the company's claim department. Three years later he was made metallurgical contact representative.

In 1934 Guy's imagination and technical ability were given full scope as he founded Granite City's metallurgy and inspection department. He served it as energetic chief until 1945 when he became company technical director.

Last month the Galvanizers' Committee of the American Zinc Institute honored Guy with its third annual award for outstanding contributions to industry. It was a particularly apt recognition, since Guy helped found the group in 1936.

Known internationally for his research work in galvanized materials, Guy has been active in numerous metal industry groups. And he somehow found time to patent a sheet steel and plate manufacturing process.

Away from the office, Guy's life has a bucolic touch. He owns a farm in Girard, Ill., and to enjoy the back-straining pleasures of pastoral life drives almost 50 miles every day to and from his office. Hobby is collecting Model T cars, vintage 1917-25.

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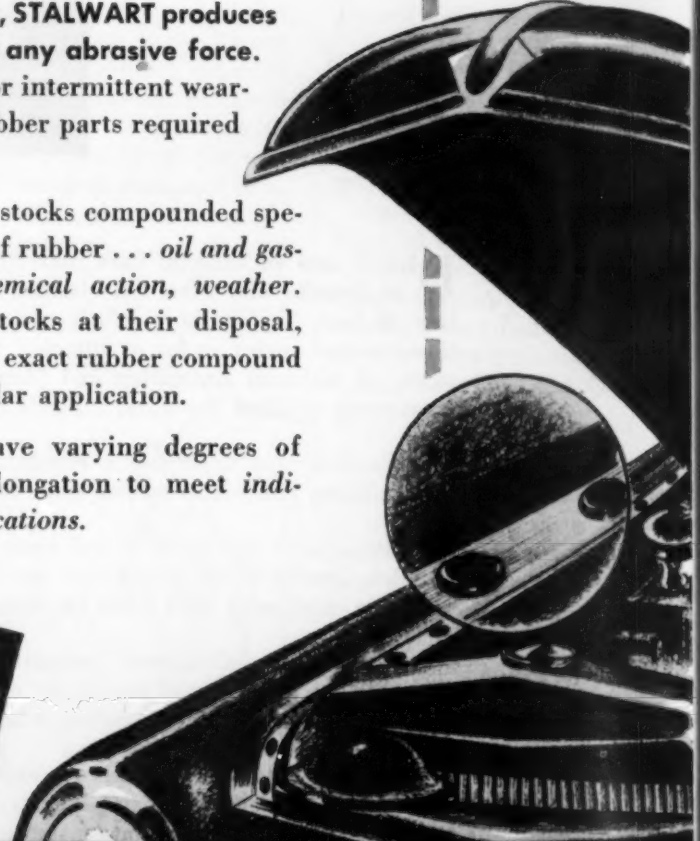

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Fred Osborne, elected president, SLOSS-SHEFFIELD STEEL & IRON CO., Birmingham.

L. J. Campbell, appointed president, FIRESTONE STEEL PRODUCTS CO., Akron, Ohio.

D. M. Houghton, elected president, ATLAS TACK CORP., Fairhaven, Mass. He succeeds the late Sherman H. Bowles.

James E. Goodman, recently elected general manager, Fisher Body Div., GENERAL MOTORS CORP., New York, has also been elected a vice-president of the corporation and a member of the Administration Committee.

Frank J. O'Brien, Jr., elected a vice-president, METAL & THERMIT CORP., New York; Charles R. Hervey, made assistant controller.

T. H. Parke, promoted to vice-president; W. H. Coburn, appointed comptroller; SCULLIN STEEL CO., St. Louis.

Richard L. Bowron, promoted to assistant to the vice-president in charge of operations, Ensley steel plant, TENNESSEE COAL & IRON DIV., U. S. Steel Corp.

Fielder Israel, promoted to executive vice-president; Carl Brooks, promoted to vice-president in charge of sales, GENERAL DRY BATTERIES, INC., Cleveland.

J. T. Bachman, elected vice-president in charge of sales; W. F. Zarbaugh, elected assistant general manager; B. P. Evans, appointed purchasing agent and traffic manager; Charles H. Longfield, Jr., joins Cleveland sales office, COLD METAL PRODUCTS CO., Youngstown.

W. W. Sproul, elected vice-president, general industrial products group of divisions; L. B. McCully, named vice-president, East Pittsburgh Div., and H. E. Seim, named vice-president, Sturtevant Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Frank M. Fitzgerald, appointed manager, production planning department, NATIONAL TUBE DIV., U. S. Steel Corp., Pittsburgh.

Horace S. Johnston, elected treasurer, UNITED STATES RADIATOR CORP., Detroit.

Harold R. Kilpatrick, named general manager of sales, LACLEDE STEEL CO., St. Louis.

C. R. Reid, promoted to assistant to vice-president in charge of sales; R. J. Kel'er, promoted to credit manager; B. B. Button, named general sales manager; DIVERSEY CORP., Chicago. Donald V. Hannibal, named director, Technical Development Dept.

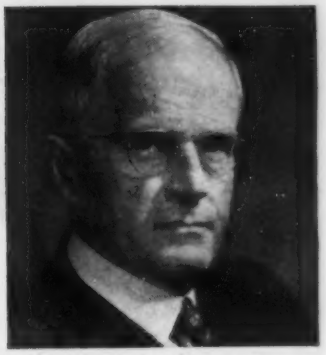
Nolan B. Sommer, named supervisor, New Product Development Dept., AMERICAN CYANAMID CO., New York.

Frederick G. Hoppe, named manager, Metal Finishing Div., PYRENE MFG. CO., Newark, N. J.

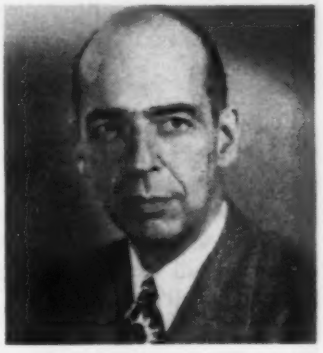
Irving C. Pick, named account executive, LISSNER IRON & METAL CO., Chicago.

M. O. Monsler, promoted to manager; W. R. Stephens, promoted to sales manager, Welding & Electrode Div. HARNISCHFEGER CORP., Milwaukee.

Theodore R. Patrick, appointed general manager, Highland Park Plant, CHRYSLER CORP., Detroit.



PAUL D. MERICA, elected president, International Nickel Co. of Canada, Ltd. and its U. S. subsidiary, International Nickel Co., Inc.



J. M. WILKE, elected vice-president and director, Laclede Steel Co., St. Louis.

H. GEORGE DE YOUNG, appointed vice-president operations, Atlas Steels Ltd., Welland, Ont.

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Personnel

Continued

John A. Robinson, named sales manager, Eastern and Mid-Atlantic regions, Industrial Div., MINNEAPOLIS - HONEYWELL REGULATOR CO., Minneapolis; **Joseph J. Matulis,** appointed industrial manager, Midwest region; and **C. G. Behnke,** promoted to industrial manager, Chicago branch office.

George M. Burgess, appointed sales manager; **Sam N. Roberts,** appointed plant manager, GARLAND MFG. CO., Detroit.

W. R. Warren Leisy, appointed chief chemist, WHEATLAND TUBE CO., Pa.

Robert F. Moody, appointed sales manager, Eastern industrial truck division, HYSTER CO., Portland, Ore.

Scott H. Patterson, appointed branch manager, Buffalo plant, AMERICAN BRASS CO., Waterbury, Conn.

E. M. Stuart, named sales manager, Northeastern region; **A. Lee Proctor,** named sales manager, Southeastern region; **Raymond G. Horner,** appointed sales manager, Central region; **W. L. Poynter,** Midwest region; **Arthur S. Boehm,** Pacific Coast region; and **Donald S. McKeracher,** Canada, BLACK & DECKER MFG. CO., Towson, Md.

Carl F. Jensen, apppointed manager, newly-formed Special Stamping Dept., SHAKEPROOF INC., Div. of Illinois Tool Works, Chicago.

Thomas Hinchliff, appointed applications engineer, BOWSER TECHNICAL REFRIGERATION, DIV. Bowser Inc., Terryville, Conn; **Herman I. Rudman** and **Albert A. Hooper** were named project engineers.

W. S. Newell, promoted to manager sales, Houston office, SHEFFIELD STEEL CORP., Kansas City.

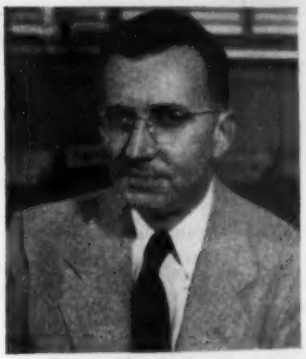
J. F. Davis, appointed district sales manager, newly-formed Newark District; **E. B. Colby,** named district sales manager, newly - formed Pittsburgh District; SYLVANIA ELECTRIC PRODUCTS INC., New York.

Seery C. Gordon, appointed domestic sales manager, CAPEWELL MFG. CO., Hartford.

Robert E. Etherton, appointed Chicago district manager, PENINSULAR GRINDING WHEEL SALES CORP., Detroit.

GORDON J. BERRY, elected president, Electric Products Co., Cleveland.

GEORGE T. COLLINS, elected assistant to the president, Pennsylvania Salt Mfg. Co., Philadelphia.



F. J. de LORME, appointed secretary and assistant treasurer, E. W. Bliss Co., Canton, Ohio.

W. A. MANGOLD, appointed general sales manager, U. S. Drill Head Co., Cincinnati.

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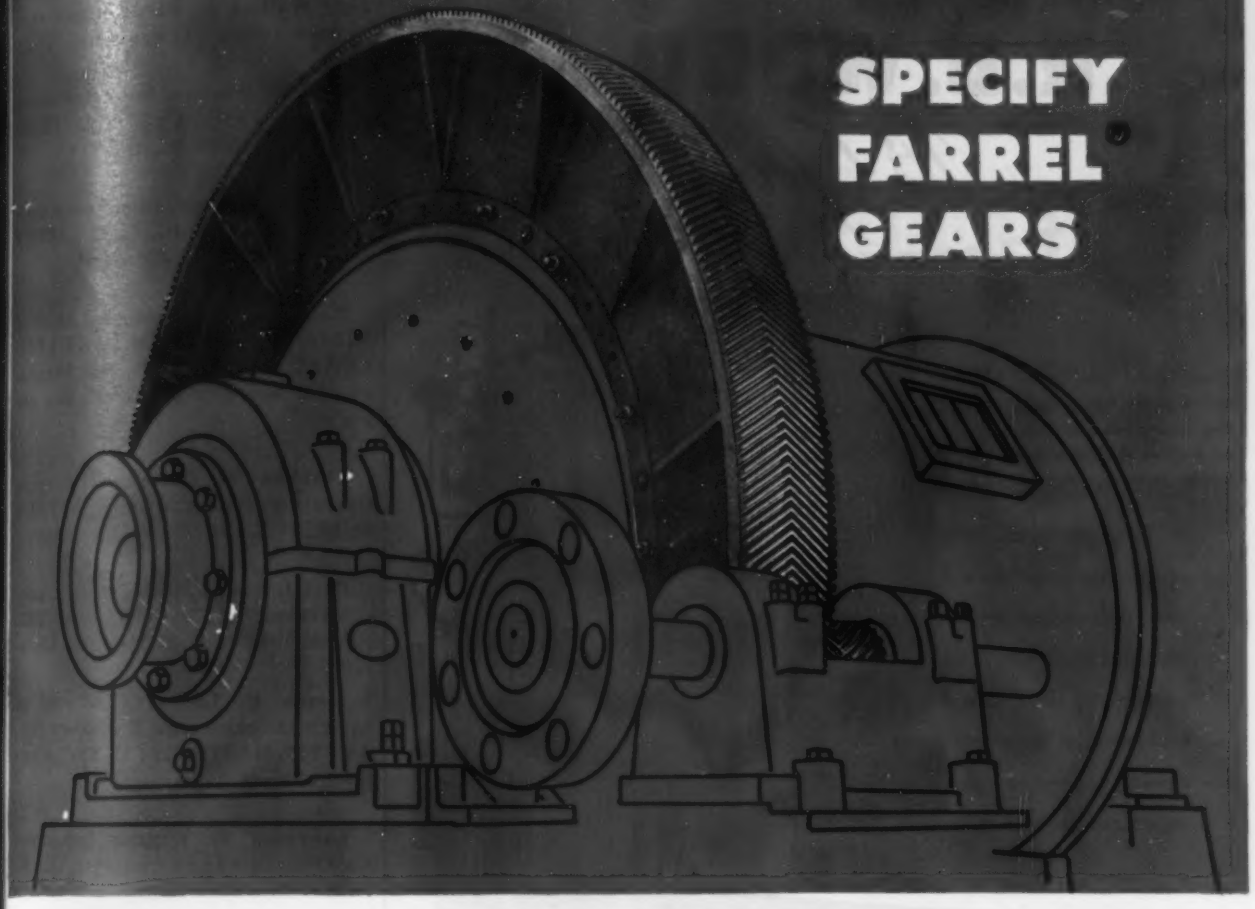

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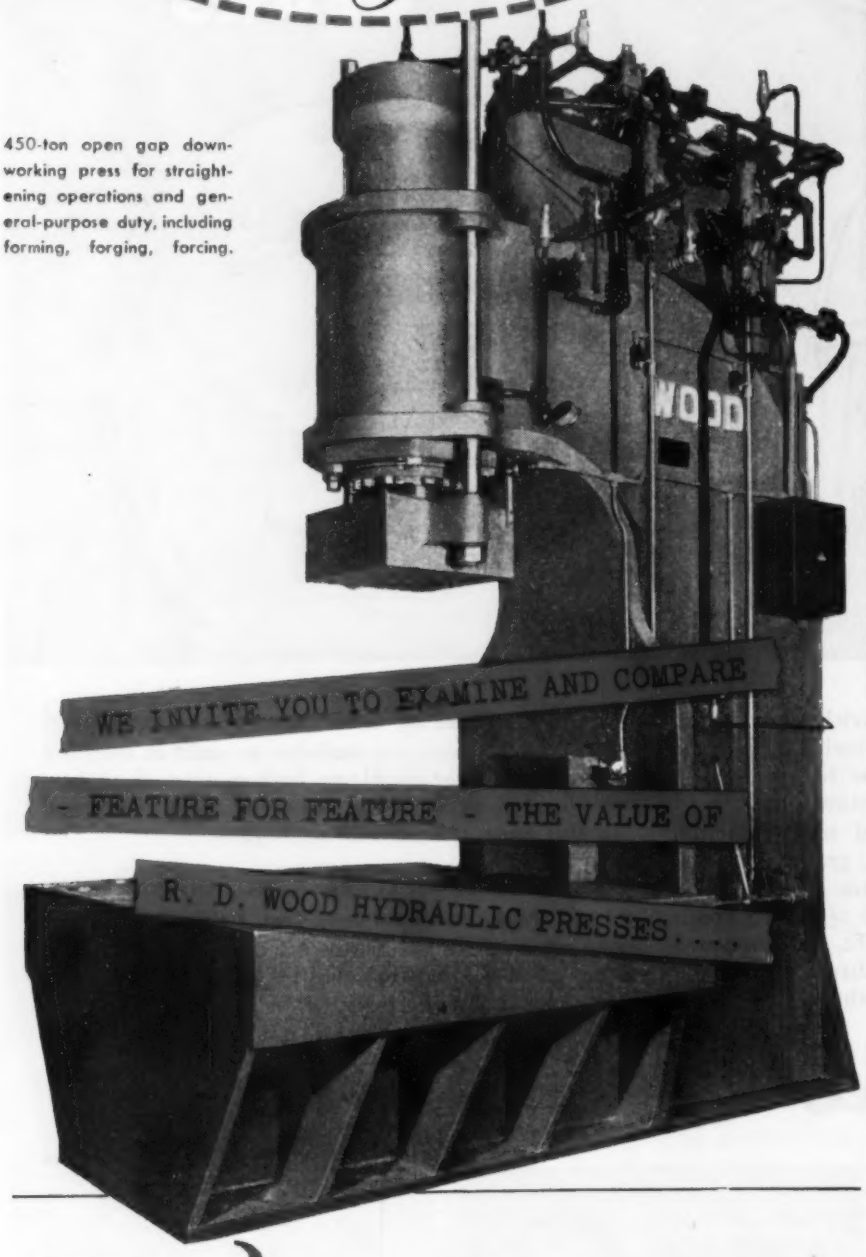

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Ray E. Winters, appointed safety director, INLAND STEEL PRODUCTS CO., Milwaukee.

Donald T. Boody, named sales engineer, Pacific Coast, THE PARKER APPLIANCE CO., Cleveland.

R. F. Roberts, appointed chief of billing, BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco. He succeeds B. G. Mullen, deceased.

Franklin E. Satterthwaite, joins Operations Research Group, ARTHUR D. LITTLE INC., Cambridge, Mass.

Paul J. Krause, named district sales representative, Toledo, U. S. STEEL SUPPLY DIV., U. S. Steel Co., Cleveland.

Joseph B. Lanza, joins staff of equipment engineers, Machinery Div., AUSTIN-HASTINGS CO., INC., Cambridge, Mass.

Lawrence J. Wimmer, appointed Eastern service manager, E. W. BLISS CO., New York.

Anthony J. Allen, joins WALL COLMONOY CORP., Detroit, as Eastern sales manager with headquarters in New York.

Russell E. Poster, appointed abrasive sales engineer, CLOVER MFG. CO., Norwalk, Conn.

William H. Blankenship, Jr., appointed assistant foreman, manufacturing division, Decatur, Ala., plant, CALUMET & HECLA CONSOLIDATED COPPER CO., Boston.

OBITUARIES

Clarence C. Rausch, 57, assistant vice-president and manager, NO-OX-ID Rust Preventive Sales, Dearborn Chemical Co., Chicago.

John C. Trefts, 73, recently retired president, Farrar & Trefts, Inc., Buffalo.

Leslie D. Hawkbridge, 60, metallurgist, authority on steel processing and president, Hawkbridge Brothers, Boston.

The Iron Age
FOUNDED 1855
Technical Articles

Job foundry tackles SHELL MOLD PRODUCTION

Shell mold castings of gray and ductile iron have been successfully produced for 6 months in a pilot plant operation of the Lynchburg Foundry Co., Lynchburg, Va. Two men handle all operations on the specially designed 4-station machine used to produce the molds. The shell molding machine operates on a turntable with arms supporting four patterns at 90° intervals. The cycle includes sand application, two curing stations, and a stripping station. Uniform heating of patterns is important to avoid difficulties in stripping, warpage, uneven curing, and thin shell walls at critical locations.

By G. Palmer Derby
Industrial Engineer
Lynchburg Foundry Co.
Lynchburg, Va.

In the Spring of 1951, the Lynchburg Foundry began considering the possibilities of shell molding as a process adaptable to its shop. By June of that year the engineering department had begun the ground work for designing an experimental pilot unit that would fit into existing foundry facilities.

A machine was developed which produced successful molds by October 1951. The department worked in close collaboration with Mr. E. N. Harrison of Econocast, Inc., Chattanooga, Tennessee, engaged to assist in construction of the pilot unit, patterns, and the development of methods. This time covered full design and building of machine and patterns.

The process, carefully considered prior to beginning work, lends itself readily to the Lynchburg plant. Recent sale of the company's walking plow business provided available space for a shell molding unit. Since castings were poured in a vertical shell, it was believed a large tonnage could be handled in a relatively small area. This assumption is now being borne out in the production of a casting formerly made in green sand. Fifty shell molds may be poured in an area that would formerly have been occupied by approximately 12 green sand molds for the same casting.

Excellent melting facilities are available in the shop chosen, and the production capacity from the shell machine will enable fuller utilization of this portion of the plant. The shop is housed in one of the original buildings of the plant, which despite its age, is still suitable for this work. The shell molding equipment, being relatively light, lends itself well to the old building.

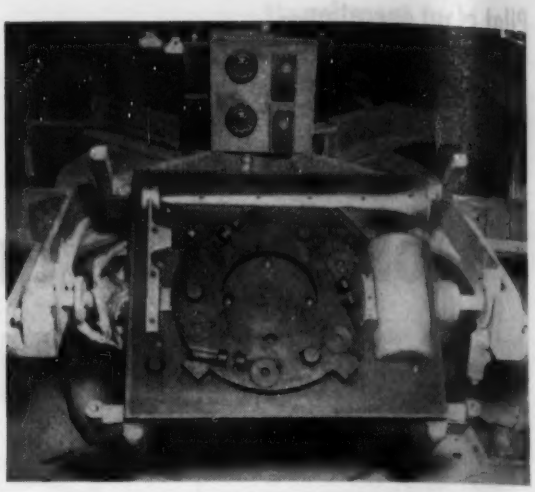
The two men selected to do the manual work on the machine had formerly operated jolt squeeze and snap flask machines. They quickly adapted themselves to the shell molding process. This may tend to indicate that the average green sand molding operator may well qualify for work in shell molding with a short period of training.

The shell molding machine was designed on a turntable principle with arms supporting four patterns at 90° intervals. Patterns were mounted on trunnions so that they may be rotated 180°. The cycle of making a shell includes passing through four stations around the turntable; sand-application station, two curing stations, and a stripping station. All operations performed on the machine thus far have been done manually. Plans for completely mechanizing the unit are now in the shop or being formulated.

Applying sand to the pattern presented a num-

Sand rains on pattern—

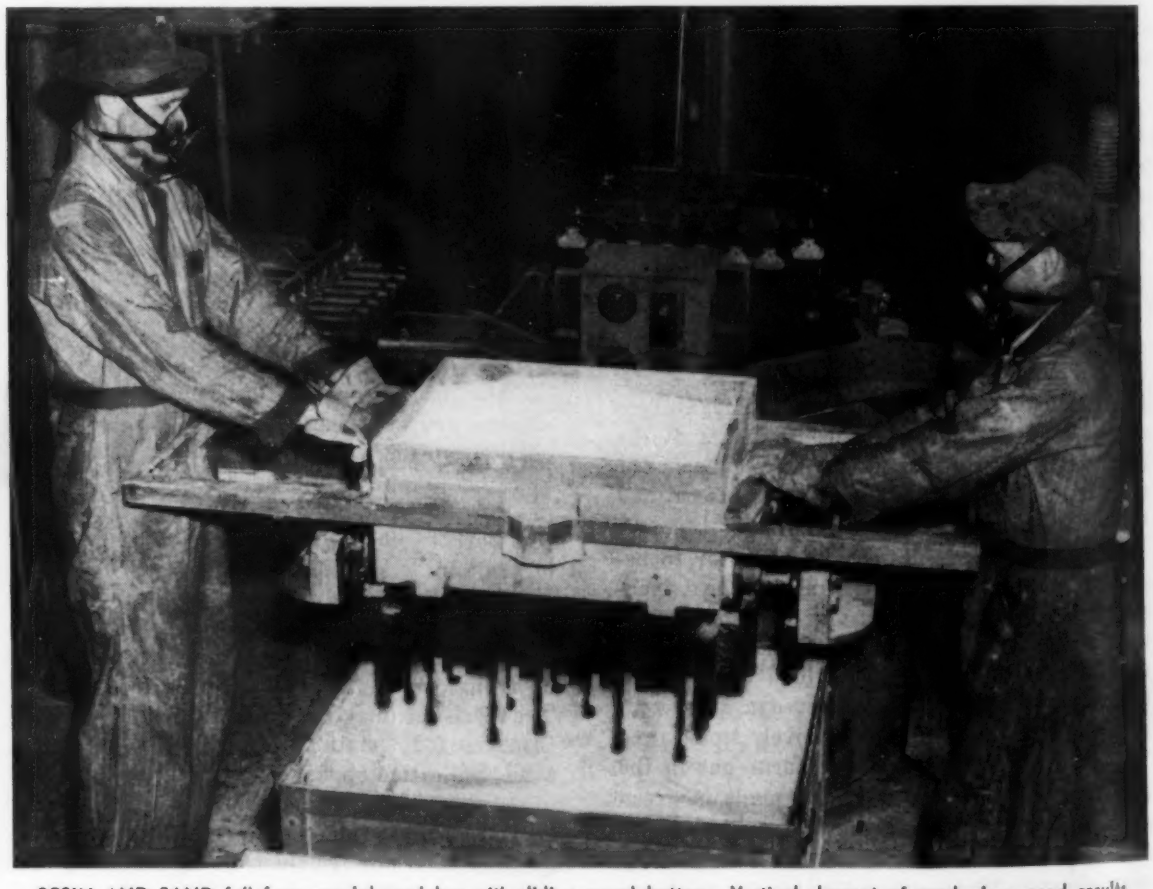
OPPOSITE SIDES of casting produced in pilot plant operation at Lynchburg Foundry Co. are shown above.



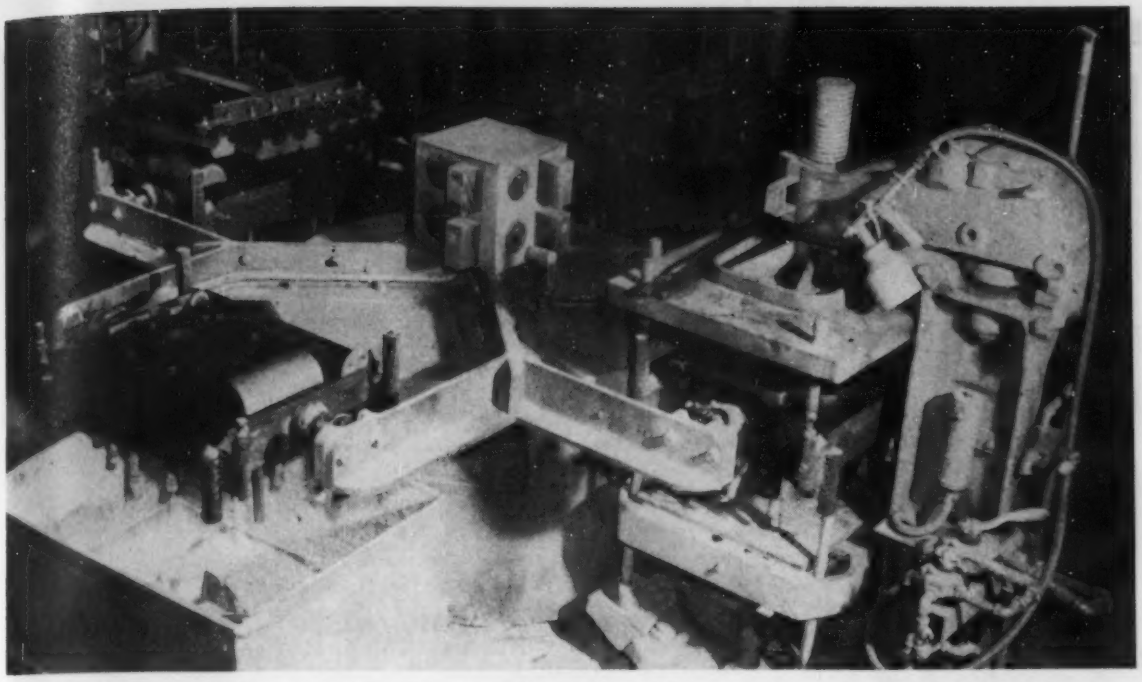
GATING AND RISERING of pattern plate is shown above. Mounted on machine trunnions, patterns rotate 180°.

ber of problems, and is now being done successfully with a relatively simple device. A silicone emulsion is applied to the heated pattern as a release agent, and a square frame 5 in. high is attached around the outside edge of the pattern.

Next, a sand box with a sliding panel bottom is filled with sand to a depth of approximately 4 in. and set on top of the wooden frame about the pattern. The bottom panels of the box are then pulled apart gently allowing the sand to fall straight down to the pattern, producing a rain-



RESIN AND SAND fall from special sand box with sliding panel bottom. Vertical descent of sand gives good results on patterns with intricate designs such as small, deep holes. Sand mixture on pattern cures in about 12 seconds.



CLOSEUP OF MOLDING machine shows stripping station, right, two curing stations, rear, and sand application station, left. Stripping unit is a converted jolt-squeeze-strip machine.

ing effect. This vertical descent of the sand across the pattern has given very good results on more intricate pattern designs, such as deep small holes in the pattern surface.

The sand box is then removed, and the sand mixture on the pattern allowed to cure for approximately 12 seconds. The excess sand is then dumped from the pattern by rotating the patten through 180° and back.

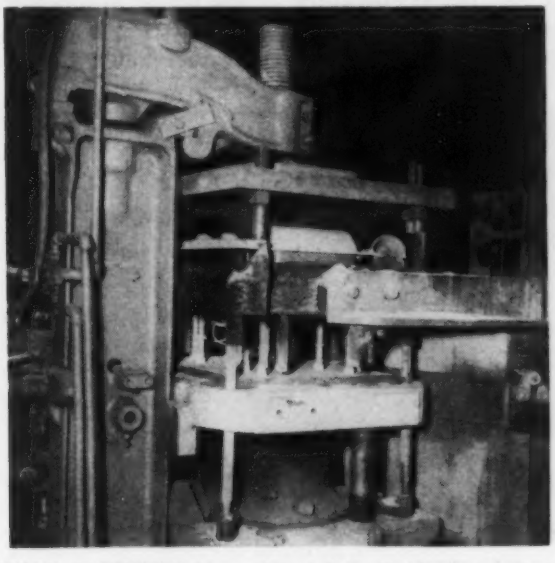
Next, the turntable is rotated to move the shell under an external curing station. These heating stations are composed of eight 1100 w Chromolox units attached in a bank. The shell is left under each curing station from 15 to 20 seconds before moving to the stripping station.

The stripping machine is a converted jolt-squeeze-strip machine, and was used only temporarily to provide a hydraulic cylinder to push the stripping pins up to strip the shell from the pattern.

A drive and indexing mechanism are being built for the turntable so it may be geared to the shell curing time. A new stripping machine is being constructed that will be more flexible and adaptable to the cycle of the machine. A mechanical sand-applicator is now being designed. All of this equipment must be highly flexible and suited to a number of different patterns in shape and size.

The pattern equipment is of basic importance and must be well made for accurate results. Accuracy must be built into them to reproduce

TEMPERATURE CONTROL is important. Here surface temperature of pattern plate is measured with pyrometer.



SHELL IS STRIPPED from pattern plate at stripping station. Jolt-squeeze-strip machine was converted for job.

Bedded in for pouring—

SHELLS ARE BEDDED in box prior to casting. Both shot and sand have been used for bedding-in materials.

molds from which castings with a few thousandths of an inch tolerance may be made. Heating of the patterns to a uniform temperature, in the 450°F range, is important. Uneven pattern temperatures can cause innumerable difficulties, stripping the shell may become a serious problem, warpage increases with an uneven cure, and shell wall thickness varies in critical locations.

Patterns are heated continuously with Calrod heaters controlled by proportional timers to hold a constant temperature. These temperatures are checked periodically with a surface pyrometer to insure a constant temperature range. The pattern plates are comparatively heavy, 1¼ in. thick—which helps appreciably in maintaining the desired temperature.

AIR VIBRATORS attached to side of box settle down bedding-in material, in this case shot, around five complete shells.

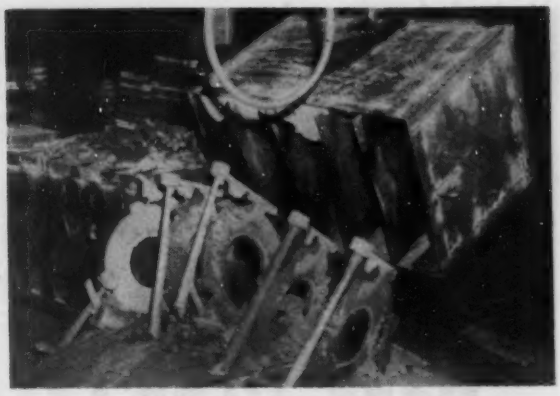
Auxiliary equipment for the operation includes a simple assembly bench, a 150 lb batch capacity concrete mixer for blending resin and sand, a number of sheetmetal flasks, and four sand hoppers that contain shell bedding-in sands.

Production thus far has been held to a comparatively small scale, with two men doing all of the work including making the shells, bedding them in and pouring them off. Primarily, production has been conducted on an experimental basis. An average day's work is considered 50 molds of a 6-in. pipe gland. The shell size is 20 in. x 20 in. This is not indicative of the potential production of the machine as it is limited only by the shell curing cycle. Fully mechanized, it may be possible to produce a shell every 15 seconds or a complete mold every 30 seconds.

Molds have been produced for both soft gray and ductile iron castings. An average analysis of soft gray and ductile iron used is shown in the table on the opposite page.

Shells have ranged in size from 20 in. x 20 in. for the pipe gland to 22 in. x 25 in. for a ductile iron pressure plate. Pouring weights are as follows: 6-in. gland, 17 lb; 11-lb finished casting, ductile pressure plate, 102 lb; 45-lb finished casting, and ductile track roller 170 lb, 98-lb finished casting.

POURING operation is shown. Both gray and ductile iron castings are produced in the Lynchburg shell mold shop.



UNTRIMMED CASTINGS are dumped from box. Dimensional control better than present 0.002 to 0.003 in. is sought.

With inauguration of shell molding in the shop, it was necessary to establish a standard experimental procedure for testing materials. Resin was the first material to be investigated as it was the first in the chain to produce a shell casting.

The various standard resins were tested in order to determine the cure time, flow characteristics, and segregation properties. A resin was selected considered suited to the experimental use. This resin was a 2-stage medium by fast curing resin capable of being blended with a dust suppressant without a mulling action. A standard mixture of 6 pct resin to sand by weight was finally settled upon for all experimental work.

The gating of the shell mold presented entirely new problems to the organization. Curves had previously been established for gating in green sand, and these were used as a basis to design gates for the shell mold. It was soon ascertained that the shell mold poured considerably faster than a comparative green sand mold. Further work is being done to establish a standard gating procedure.

The question of shot v sand as a bedding-in material was studied. Work is being continued on this point as both have merits. Shot over a number of tests has produced castings of more accurate measurement and smaller standard deviation. This has been offset to some extent by a higher Brinell reading indicating a slight chilling action which may adversely affect metallurgical control. The shot presents a handling problem in the shop which would be minimized with use of a sand backup to support the shells.

After experimentation, a very light lubricating oil was decided upon as a dust suppressant in the resin sand mix. This replaced fuel oil as a suppressant and was used in quantities of 0.1 pct by weight in the sand mixture.

Different types of sand have been tested. Blends of coarse and fine sand, straight coarse sand, and straight fine sands have all been tried. It was found the coarser sands had better flow characteristics when applied to the pattern; however, appreciable difference was noticed in casting finish. There appeared to be more burnt-on sand on the casting with the coarser sands. Casting finish did not fall in the same category as those produced with the fine sands. A blend of sands did not appear to be the solution due to segregation in the handling of the sand. Final solution for the problem lay in a sand of 130 AFS fineness, essentially a screen sand. It was determined this sand should have a very small amount of pan material, and be clay free. The clay in the sand mixture noticeably reduced the strength of the shell.

Generally speaking, results of experimental work have been gratifying. Consistent work has indicated that tolerances should fall within 0.002 to 0.003 in. per in. Better control than this has been obtained in a number of test runs. Better dimensional control is sought than this would indicate during continuous production.

The problem of pin holding in ductile iron castings is still present. Surface finish of the castings compared to green sand molding has been excellent. The castings have, for the most part, involved little or no grinding with the exception of the gate and riser connection areas. Shot blast seems in order to remove small deposits of burnt-on sand and to give castings a uniform appearance.

Experimental work will be continued jointly with modearte production runs.

Objectives are to develop new methods of testing and simplified production procedure. With these objectives in mind, the plant is working towards a goal of 70 to 75 tons of shell molded castings a day.

ANALYSIS OF GRAY AND DUCTILE IRON

	Soft Iron	Ductile Iron
Silicon	1.90-2.20	2.20-2.60
Sulphur	0.12 Max.	
Manganese	0.60-0.80	0.15-0.30
Phosphorous	0.15 Max	0.10 Max
Total Carbon	3.30-3.50 pct	3.40-3.80
Steel in mix	15 pct	45 pct
Tensile Str. psi	300000	90000
Yield Point		65000
Elongation		2.0 pct
Bhn	190-200	220-255

Mechanical nerve system—

Core Maker USES ULTRAMODERN CONTROLS

By Leon F. Miller
Vice-president
Osborn Mfg. Co.
Cleveland

Automatic electric timers, solenoid air valves and air cylinders make up the nerve system of the Osborn Mfg. Co.'s core making machine. Core boxes rotate through five stations. A unique core draw and rollover mechanism places the core, in its drier plate, on a roller conveyer for its trip to the drying oven. Turntable rotates about a central vertical strain rod. Operated by two men, production of over 300 cores per hour has been recorded at Buick Div. of General Motors.

A machine which would produce cores of uniformly high quality without manual assistance by trained operators has long been a dream of the foundry industry. Last year that dream came true with the automatic core maker designed and built by Osborn Mfg. Co.

First Roto-Core Automatic installed in a foundry has increased automotive engine core production by 600 pct. Buick Div. of General Motors first used the machine to produce cores for the intake manifold, water jacket and spring housings in the engine block. Original production of 240 cores an hr planned for the new core maker has been boosted by Buick to over 300 cores per hr. Only two men are needed to run the machine. Buick now has a battery of these units.

For a previous article on the core maker in use see "*Machines Make Cores Faster, Cheaper, Better*," The Iron Age, Mar. 27, 1952.

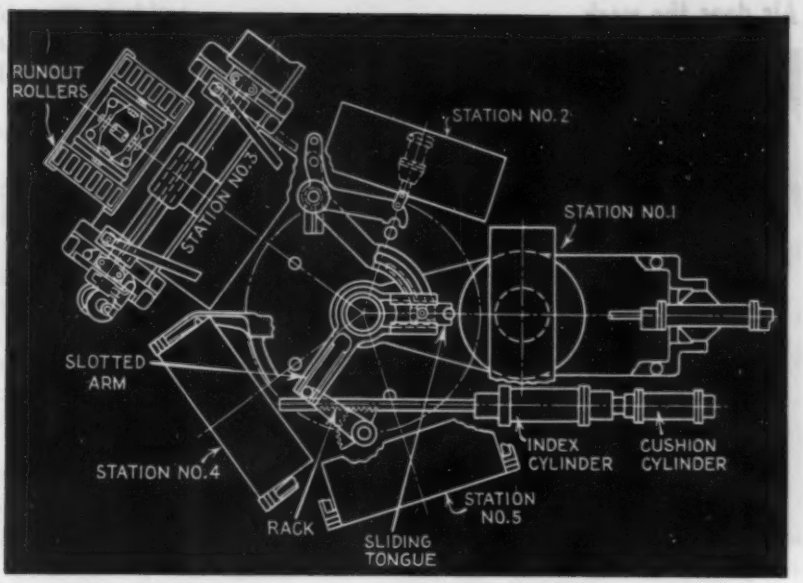


FIG. 1—Top view of core maker shows layout of actuating cylinders and arms in relation to five stations. At station No. 3 is rollover and core draw mechanism.

The machine combines a core blower, a turntable, and a combined core rollover and core draw mechanism. These are coordinated by automatic electric timers which control the operating sequence of solenoid air valves. These valves control the various operations. The core blower uses compressed air to blow prepared sand into conventional core boxes.

The 5-station turntable, moving on supporting rolls, brings empty core boxes for filling and takes away the filled boxes. The rollover and core draw mechanism, operating in sequence with the turntable and core blower, extracts cores from the filled boxes onto drier plates. A plan view of the machine is shown in Fig. 1. A side elevation illustrating the unit's construction appears in Fig. 2.

The core maker runs continuously in normal operation. A full cycle could begin and end with any one operation. Generally, the timer is set so that the turntable will index 72° or one station advance before any other operation takes place. The turntable can rotate in either direction, in this case counter-clockwise. The core blower is station No. 1.

A rack, driven by the indexing cylinder, rotates a pinion which moves an arm and attached roller. The roller is permanently engaged in one of two slotted arms of a part shaped in a broad V which oscillates about the same center of rotation as the turntable. The roller drives the part from left to right in a modified Geneva motion. A cushion cylinder helps produce a smooth motion. One arm, Fig. 3, carries a notched sliding tongue. As the indexing cylinder makes its stroke, the tongue engages one of five pins on the under side of the turntable and the table moves one station.

When the turntable stops, a separate, cylinder actuated arm, Fig. 3, engages the turntable pin

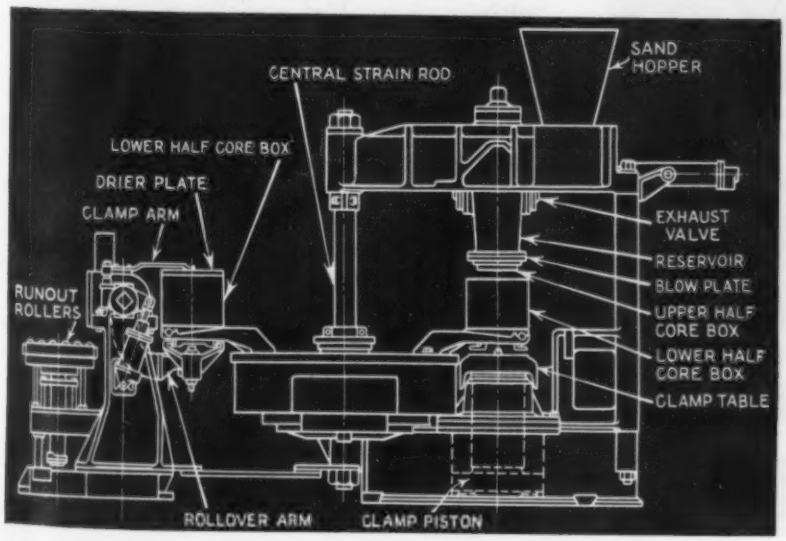


FIG. 2—Side view of machine shows relationship of core boxes to core blower, and core draw and rollover mechanism, shown at left.

Air does the work—

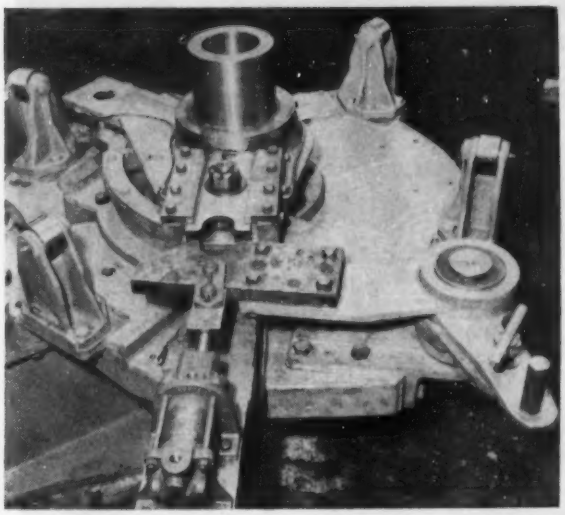


FIG. 3—Indexing mechanism shown is used in the modified Geneva movement. Turntable, on rollers, moves about central strain rod. Note turntable rollers.

FIG. 4—View of turntable and supporting base mechanism shows index lock cylinder and lock levers at left.

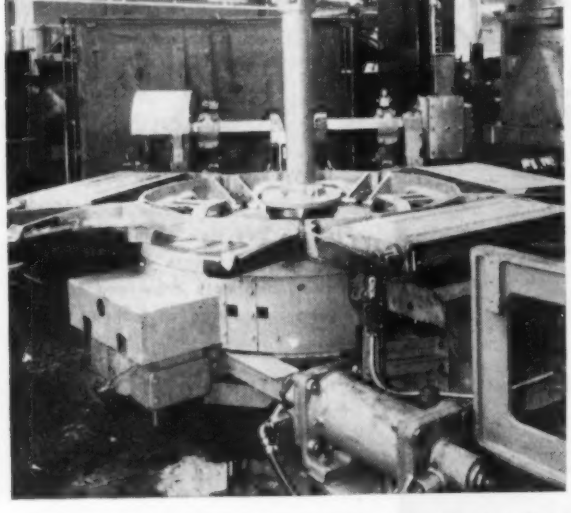


FIG. 5—Main index or drive cylinder appears at bottom center. Platens with extended trunnions rest in cradle arms at four places. Table rotates about strain rod.

and locks the table, Fig. 4. The tongue then disengages from the pin. In and out motion of the tongue is controlled by a pin riding in a slotted arm. Pressure is reversed in the indexing cylinder and the piston returns bringing the double-arm back to its original position.

Three unusual features are embodied in the turntable mechanism. A pin on the sliding tongue extends downward alongside an arced vertical rib. This rib insures positive engagement or disengagement of the sliding tongue and pin throughout the power stroke of the index cylinder. Various parts may be disengaged to permit manual turning of the table, as an aid in setting up core box alignment.

Rotates about strain rod

Core boxes are mounted on separate platens. These rest on fork-like arms, Fig. 5. Five sets of arms carry five platens with attached core boxes. The platens, Fig. 5, have two short extended trunnions which rest in notches in the ends of the arms. This permits easy removal of core boxes.

The core blower permits the turntable to rotate about one vertical strain rod rigidly attached to the base and head. Two other strain rods outside the turntable, and connecting head frame and base, allow the slide carriage and attached sand reservoir to move between them, Fig. 6. A cylinder moves the sand carriage back and forth from blow to fill position and back again while the turntable is indexing. The base of the core blower has a vertical clamp piston mounted in it. Atop this is the clamp table.

Clamp piston raises table

Sand is gravity fed from the sand hopper, Fig. 2, into the sand reservoir and the carriage. When the carriage and sand reservoir are in blow position, and table motion halts, air can be applied to the under side of the clamp piston. The clamp piston raises the clamp table. Core box and platen assembly are lifted into contact with the blow plate and reservoir, or with an upper half core box if used.

Piston pressure tightly compresses the assembly against a seal ring in the head frame of the core blower. Pressure under this clamp piston is controlled by a valve which causes the assembly to rise slowly until contact is made. Pressure then rises rapidly to hold against the blowing pressure developed within the core box.

During the blow operation the reservoir exhaust valve is shut. Air is applied to the outer side of diaphragm during the blow. When the core box is fully clamped up, the blow valve is opened and live air drives sand from the reservoir into the core box through openings in the blow plate.

When the core box is filled, the blow valve is closed. The reservoir exhaust valve opens and air in the sand reservoir escapes through screened openings in the exhaust valve.

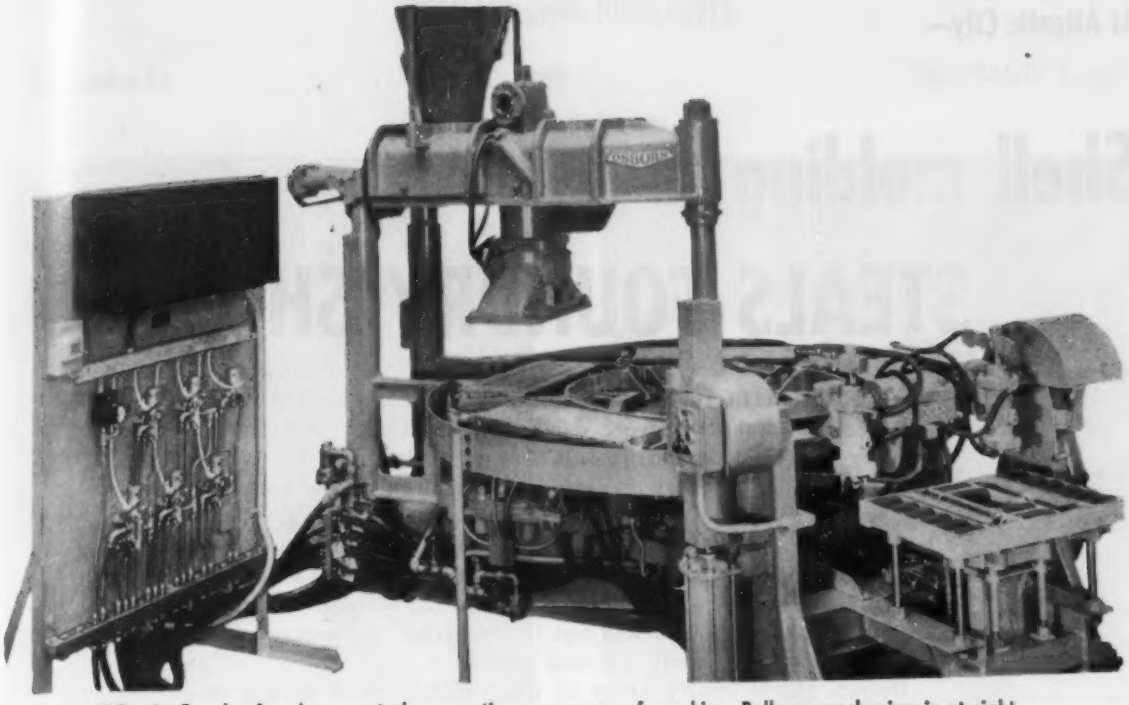


FIG. 6—Panel of valves controls operating sequence of machine. Rollover mechanism is at right.

When air pressure in the sand reservoir is exhausted, the clamp piston is reversed. Core box and platen lower, drawing the upper half of core box if used. Core box and platen return to rest in the cradle arms. The turntable rotates the filled core box from station No. 1 to station No. 2. At the same time, an empty core box from station No. 5 is brought into the core blower.

At station No. 2, a drier plate is placed over the core. The turntable indexes again and brings the filled core box and drier plate into the core rockover and draw mechanism at station No. 3. Here the platen with attached core box, core, and drier plate are clamped to the rockover arm.

On the bottom of each platen are two cleats. These lock with cleats on the rollover arm when the table rotates. Locking pressure is obtained from a cylinder.

Cylinders hold drier plates

Two clamping cylinders hold the drier plates on while rolling over. The cylinder pistons move up and down and rotate simultaneously. A pin in the bottom of the piston housing engages a slot in the piston. The pin, in the eccentric slot, causes the piston to first rotate on its vertical axis and then finish its stroke with vertical movement only. Atop the pistons are arms which clamp the drier plate.

Rolling over is accomplished as follows. A rack attached to the piston of a double acting cylinder engages a pinion keyed to the rollover shaft. As the rack moves, the pinion rotates the shaft 180°. This rolls the platen, core box, and drier plate out of the turntable into an inverted position over the draw mechanism. Levelers in the draw head rise when air is applied to draw cylinders.

The leveling mechanism permits leveling when drier plates are uneven, assuring an accurate draw. Draw head and leveling bars rise between the rollers to contact the drier plate. Simultaneously, a limit pin reaches the end of its stroke. The drier plate and core above it are now in contact with the leveling mechanism.

Vibrators run, loose pieces are removed, and the drier plate clamp arms swing out. Drier plate and core descend until their weight is transferred to runout rollers. When the core is drawn clear of the core box, the rack drives the pinion and shaft back to the starting position. Air pressure is released from platen clamp pistons and the platen rests again in the cradle arms.

A cushion cylinder eliminates shock at each end of the rollover through a crank and piston assembly attached to the rollover shaft. The crank moves 180° with the shaft. For the first 90° of rotation the piston assists in rolling over the core box and platen assembly. On the last 90° of rotation it acts as a snubber due to entrapment of air by a check valve.

At make-ready stations No. 2, No. 4, or No. 5, compressed air can be applied to the core boxes to insert or remove loose pieces or vents automatically. Make-ready operations include cleaning the box, application of parting agent insertion of loose pieces and/or vents, and, if required, placing of support wires. The mechanism can be used to make cores of various types and shapes in a wide range of materials.

Limit and pressure switches protect the core maker. Should the control timer be improperly adjusted, or an operation take longer than anticipated, the electrical circuit, broken by a protecting limit switch, cannot be closed.

At Atlantic City—

Shell molding STEALS FOUNDRY SHOW

The revolution in founding practice which has taken place in recent years was effectively demonstrated at the 56th annual meeting of AFS held last week in Atlantic City.

Mechanization of every operation from sand mixing to core drying was performed on the floor of the convention hall. These latest machines, materials and methods souped up the interest of the 16,000 foundrymen and visitors who exhausted the exhibitors for 7 straight days. Representatives of 35 foreign countries added international flavor and zest to counteract the uneasy undercurrent of concern about the steel strike.

Despite the extensive array of ultra modern, cost saving mechanical devices and equipment used for conventional foundry practice—shell molding stole the show, although only about 100 of the 5800-odd foundries in America are now using the process. By no stretch of imagination will shell molding replace conventional methods for all types of castings, but hundreds of applications have been tried and many more will eventually be made. Possibly the biggest danger at present is that the wide enthusiasm created may oversell the process unless careful testing and cost evaluation are applied by every foundry to each and every casting.

For full description of shell molding methods and installations see p. 109, this issue, also following Iron Age references: "Jobbing Foundry Adopts C-Process", Nov. 15, 1951, p. 111; "Resin Makers Push Croning Process", Nov. 15, 1951, p. 120; "Machines Make Shell Molds Automatically", Apr. 19, 1951, p. 81; "Detroit Spending Millions on Foundry Process", Aug. 3, 1950, p. 89.

SHELL MOLDING UP-TO-DATE

► Size of castings has increased from 20 to 30 lb to more than 200 lb.

► Molding cycle has decreased from 3 to 4 min to less than 30 sec.

► Steel shot back-up of completed shell mold not always necessary.

► Electrical resistance and infra-red heating units supplementing oil and gas ovens.

► Percent resin by weight reduced from 6 to 8 pct to 3½ to 6 pct in many cases.

► New phenolic resins for faster curing are now in use.

► Dust suppressant just announced which reduces segregation of mix without changing significant characteristics of sand-resin mix.

► Shells thicker than ¼ in. give rougher surfaces allegedly due to loss of permeability.

► Amount of draft on pattern varies widely; no general rule yet established.

► Use of shell cores may ultimately exceed use of shell molds.

► Present resin prices hurt shell mold cost more than shell core cost.

► Combination of green sand cores or molds with shell molds or cores has just started to be given proper attention.

► Disadvantage of shell cores is they can't be blown as core box for shell cores must be vented.

► Steel shot back-ups of shell molds produce less porous castings than do sand back-ups.

► More rapid cooling rates in green sand molds give finer as cast grain size than do shell molded castings.

► Cast test bars show shell molding of brass and bronze give higher ultimate strengths, lower yield strengths and higher elongation than that obtained by green sand practice.

SHELL MOLDING HIGHLIGHTS

The Borden Co. ..... and ..... Shell-O-Matic Corp.

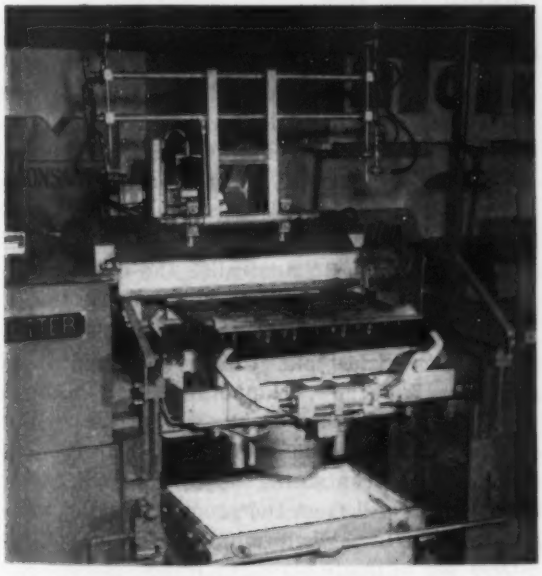
Semi-Automatic Machine

PREHEATED PATTERN PLATE inverts on dump-box to be invested with sand-resin mix. This machine produces up to 60 molds per pattern per hr. Unskilled operators are able to run the machine with ease.

SHELL MOLDS are easily bonded together by fast drying adhesive. Kitchen cleanliness is another attractive feature of the shell molding process. During the show metal was cast into these molds which were unsupported by any backup.

Monsanto Chemical Co. ..... and ..... Sutter Products Co.

Fully-Automatic Machine



KNOCKOUT PINS LIFT the cured shell off pattern plate. Curing oven is shown behind the shell. Spray guns mounted on arms above the oven automatically cycle and spray pattern plate with parting agent.

GATES, SPRUES AND RISERS are molded in the shells. Dump box containing sand with 3 to 6 pct resin is shown below the rollover pattern plate table. Simple push button panel controls the entire operation.

In between technical sessions, committee meetings, luncheons and the show many conventioners found time for plant visits. Organized plant tours of 28 foundries and sand producing plants were conducted during the International Foundry Convention.

Concurrent with the show, technical meetings were held each day of the convention. Nonferrous papers were presented the first half of the week and ferrous subjects were discussed during the remaining days.

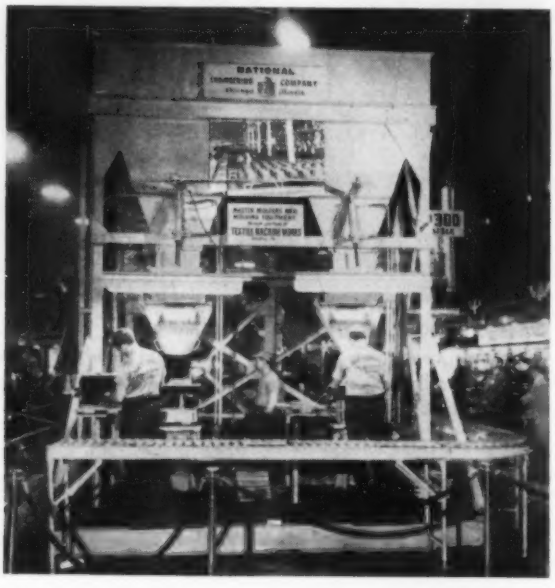
The nonferrous sand shop course held at 4:00

MAIN FLOOR of the exhibit was crowded with displays of the latest in foundry equipment. The sand handling and preparation unit in the foreground is complete with shake out screen, sand muller and aerator. The overhead sand storage and molding machines appear at the left.

Nodular iron still popular—

PM Friday broke all attendance records. This meeting, "Symposium on Shell Molding" was chairmanned by G. M. Etherington, American Brake Shoe Co., Mahwah, N. J. A well informed panel of foundrymen served as discussion leaders and brought those in attendance up to date on shell molding practice.

Nodular iron was one of the popular subjects on which technical papers were delivered during the ferrous sessions. H. Morrogh of The British Cast Iron Research Assn., delivered a paper, "Influence of Some Residual Elements and Their Neutralization in Magnesium-Treated Nodular Cast Iron."



SQUEEZER MOLDERS who turned out one mold a minute all day long attracted plenty of spectators.

Elements which tend to inhibit the formation of nodular graphite are lead, antimony, bismuth, aluminum and copper. Mr. Morrogh showed that the amounts of these elements present determine their effect. He demonstrated that cerium will neutralize the harmful effects of Ti, Pb, Bi, Sb, Al and Cu. A nickel-magnesium-cerium alloy was used in the test heats. Less than 0.005 pct Ce was sufficient to neutralize the combined effects from 0.019 pct Pb and 0.08 pct Ti.

Another paper of interest was delivered by Richard Schneidewind, University of Michigan and H. H. Wilder, Vanadium Corp., Detroit. This paper "Commercial Experience With Higher Silicon Nodular-Irons," showed that nodular irons containing up to 4 pct Si can be made which will meet the proposed ASTM specification of 10 pct minimum elongation at the 60,000 psi ultimate strength levels.

R. W. Lindsay, Penn State College and A. Shames, North American Aviation, Columbus, Ohio, reported on the "Effect of Percentage of Nodular Graphite On Mechanical Properties of Magnesium-Treated Cast Iron." The investigators concluded that the greatest improvement in strength and ductility occurs when the treated iron contains from zero to about 50 pct nodules. This improvement is due to the presence of stubby flakes and nodular graphite instead of just normal shaped flakes.

What do they cost?—

Titanium aircraft engine parts: AN ANALYSIS

By H. H. Hanink
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Wright Aeronautical Div., Curtiss-Wright Corp.
Wood-Ridge, N. J.

Using titanium alloys in crankshaft and connecting rods of a reciprocating aircraft engine, in place of alloy steel, more than 40 pct in dead weight can be saved. But big problems must be solved before titanium may be widely used. First is its high cost. Creep properties, even at low temperatures, may control design stress limits. Ti-275A, polished, has about the same fatigue strength-tensile strength ratio as alloy steel. In the notched condition it is only one fifth as good. Shot peening appears to affect titanium adversely. Forging costs may be 50 pct higher and machining costs 100 pct higher.

Maximum advantage from the use of titanium in the reciprocating type engine should come from substitution of alloys equal in strength to the steel alloys now employed in the crankshaft and connecting rods. It is possible to save about 40 pct in dead weight, and increase this saving in the connecting rods by substantial reduction in the required weight of the crankshaft counterweights.

In one of the modern 18-cylinder reciprocating aircraft engines the crankshaft is an assembly of three pieces—front, center and rear, with the front and rear pieces carrying the counterweights and clamped to the center section with a friction joint. The propeller shaft and front crankshaft are coupled through a planetary reduction gear with the drive gear splined to the crankshaft with tight fitting splines which are noncase hardened.

In the crankshaft center section, the master rod bearing journals and anti-friction bearing support surfaces are carburized for added resistance to wear, scoring and chafing. The alloy steel used for all main shaft parts except the crankshaft center is AMS 6415 (SAE 4340), heat treated to 285-321 Bhn. The crankshaft center is AMS 6260 (SAE 9310) carburizing steel with a core hardness of 290-375 Bhn and a minimum hardness of 58 Rc on carburized surfaces.

From the group of steel and titanium alloys listed in Table 1, Ti-150A, RC 130B and L2748 titanium alloys are all adequate substitutes

THESE QUESTIONS MUST BE ANSWERED

1. Can the well known tendencies of titanium toward cold welding, or "picking-up" be overcome satisfactorily on spline teeth and clamp joints?
2. While titanium can be surface hardened by such treatments as oxidizing and carburizing, will surfaces so treated show adequate anti-wear and anti-chafe properties?
3. How will the low modulus of elasticity of titanium, a little over one-half that of steel, affect the natural frequencies and deflections of the shaft assembly?

TABLE I

COMPOSITIONS OF AIRCRAFT ENGINE MATERIALS AND COMPARABLE TITANIUM ALLOYS

Name	C	Mn	Si	Cr	Ni	Mo	W	Sn	Ti	N	Mg	Cu	Al	Zn	V	Fe	O	P	S
AMS 6322 (SAE 8740)	0.40	0.87	0.27	0.50	0.55	0.25										Bal		0.040	0.040
AMS 6342 (SAE 9840)	0.40	0.80	0.27	0.80	1.00	0.25										Bal		0.040	0.040
AMS 6412 (SAE 4337)	0.37	0.75	0.27	0.80	1.82	0.25										Bal		0.040	0.040
AMS 6415 (SAE 4340)	0.40	0.75	0.27	0.80	1.82	0.25										Bal		0.040	0.040
AMS 6260 (SAE 9310)	0.10	0.55	0.27	1.20	3.25	0.11										Bal		0.040	0.040
Timken 17-22A (S)	0.30	0.55	0.65	1.25		0.50									0.25	Bal			
AMS 5613 (AISI 410)	0.15	1.00	1.00	12.50	0.75	0.50		0.05				0.50	0.05			Bal		0.040	0.030
AMS 5510 (AISI 321)	0.08	1.50	1.00	18.0	9.50	0.50			0.65			0.50				Bal		0.040	0.030
AMS 4140 (18 S-T)		0.20	0.90	0.10	2.00				0.05		0.67	4.00	Bal	0.25		1.00			
Ti-150A (Titanium Metals Corp.)	0.02			2.70			.04		Bal	0.02						1.30	0.25		
RC 130B (Rem Cru)		4.0							Bal				4.0						
Ti-175A (Titanium Metals Corp.)	0.02			3.00			.08		Bal	0.04						1.50	0.50		
L 2748 (Mallory-Sharon)	0.50			5.00					Bal	0.02			3.00						

for the propeller shaft and crankshaft steels noted above from the standpoint of comparative tensile strengths at the low operating temperatures involved. Their specific tensile properties are compared with equivalent alloy steels in Table II.

Potential weight saving through the substitution of the suggested titanium alloys for the steels now used in main shafting adds up to about 77 lb. However, there are some important functional questions to be answered before the attractive weight saving can be attained. These are listed in the accompanying box.

Questions 1 and 3 can probably be answered best by full scale engine testing. Laboratory research on question 2 is now in progress, but in the present absence of sufficient data, the use of titanium in the crankshaft center probably should be deferred. This is likewise the reason for our present inability to consider titanium alloys for a large number of gears which might permit very large total weight savings. Surface hardening treatments applied to titanium may offer equal benefits from improved fatigue strength at the roots of the teeth as for carburized or nitrided steels.

Articulated connecting rods, Fig. 1, are required for an 18-cylinder engine. Along with the crankshaft journals, articulated connecting rods comprise the majority of the rotating mass about the crankshaft. Table II indicates that Ti-175A titanium alloy provides adequate strength for direct substitution in connecting rods, weight saving based on present steel parts and including counterweight saving, would be about 51 lb.

Since standard steel rods are able to show good endurance at up to 200 pct of simulated take-off conditions, it would appear reasonable to question the notch sensitivity of the titanium alloy used. Fig. 2 shows that while Ti-175A

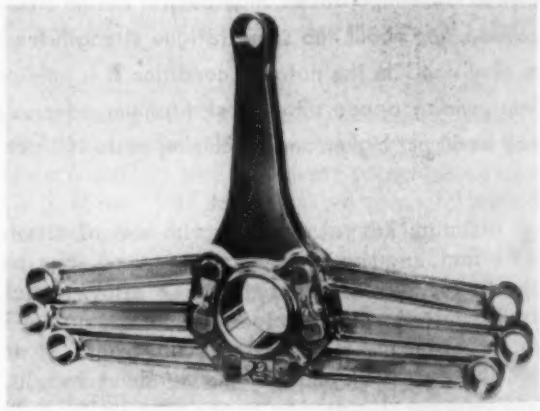


FIG. 1—Typical Master and Articulated Rod Assembly for a Radial Reciprocating Engine.

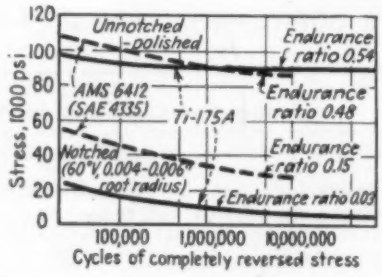


FIG. 2—R. R. Moore Rotating Beam Notch and Standard Fatigue Curves for AMS 6412 (SAE 4335) and Titanium Alloy Ti-175A.

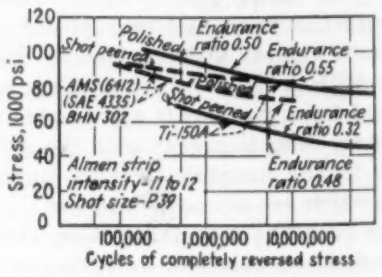


FIG. 3—R. R. Moore Rotating Beam Fatigue Curves showing the effects of shot peening on AMS 6412 (SAE 4337) and Titanium Alloy Ti-150A.

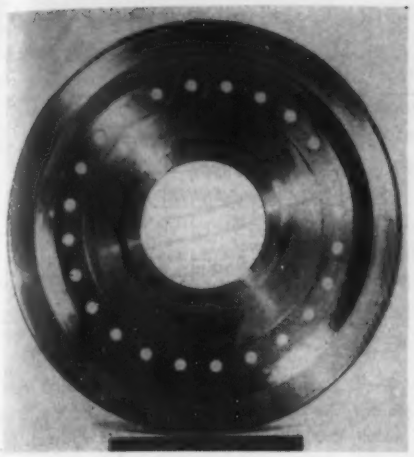


FIG. 4—Compressor Rotor Disc Made from L2748 Titanium Alloy Forging. Yield strength vs. temperature is important.

has a fatigue strength/tensile strength ratio about the same as for the alloy steel used in connecting rods when in a smooth, polished state, it is only about one-fifth as good when tested in the notched condition. Tests indicated that this extreme characteristic is not necessarily true for all alloys or for all conditions of heat treatment and notch machining practice, but there are indications that none of the titanium alloys will equal steel in this respect.

Alloy steel connecting rods enjoy another advantage over titanium in that their fatigue strength is increased by shot peening, whereas fatigue tests on shot peened titanium have thus far indicated a detrimental effect as illustrated in Fig. 3.

Along with the crankshaft center section and case hardened gears, another major steel engine part which may not be readily adaptable to the use of titanium alloys is the crankcase assembly. This assembly could provide a weight saving of about 70 lb if made from titanium alloys, but in this case the low modulus of titanium might permit excessive deflection and cause an extreme problem of chafing under cylinder decks and between the three sections, as well as the probability of fatigue troubles with capscrews, studs and cylinder barrels. Weight savings less than maximum might still be achieved if space considerations permitted

TABLE II

ROOM TEMPERATURE TENSILE PROPERTIES OF ALLOY STEELS AND TITANIUM ALLOY EQUIVALENTS

Material	Ultimate Tensile Stress	0.2 Pct Yield Stress	Proportional Limit	Elongation, Pct	Reduction in Area, Pct	Hardness, Bhn
RC-130B (Rem Cru)	150,000	140,000	105,000	15	40	320
Ti-150A (Titanium Metals Corp.)	150,000	135,000	100,000	16	40	320
AMS 6415 (SAE 4340)	150,000	140,000	125,000	16	48	285-321
AMS 6260 (AMS 9310)	150,000	140,000	125,000	16	48	290-321
Ti-175A (Titanium Metals Corp.)	175,000	160,000	130,000	15-25	50	350
AMS 6412 (SAE 4337)	180,000	160,000	140,000	15	50	331-375

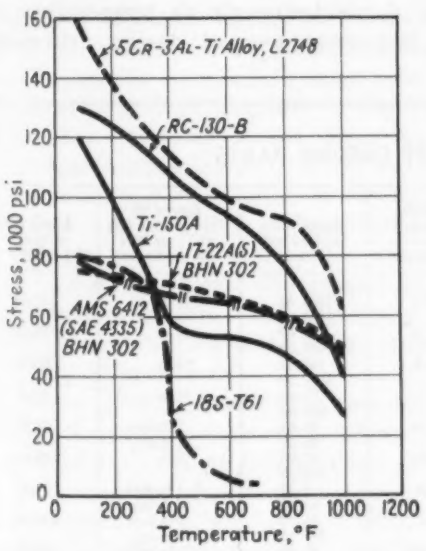


FIG. 5—Comparison of the 0.2 pct offset yield strength of potential compressor disc materials vs. temperature adjusted to the density of titanium.

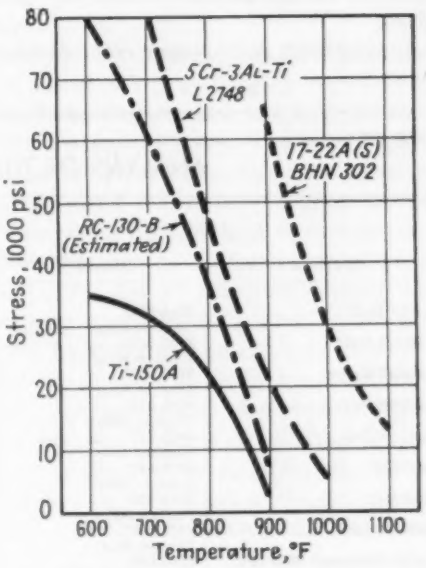


FIG. 6—Comparison of stress to produce a total plastic strain of 0.5 pct in 1000 hrs vs. temperature of heat resistant ferritic alloy and titanium alternates.

How much weight can be saved?—

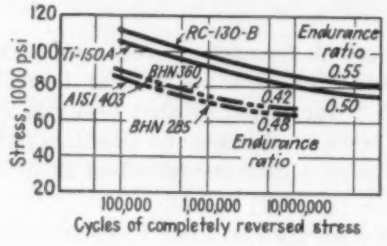


FIG. 7—R. R. Moore Rotating Beam Fatigue Curves comparing a typical compressor blade steel with two Titanium Alloy alternates in the polished condition.

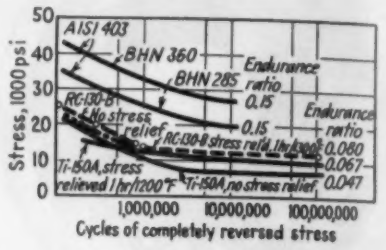


FIG. 8—R. R. Moore Rotating Beam Notch Fatigue Curves for the Titanium Alloys noted in Fig. 2 (60° "V" notch, 0.004 in. to 0.006 in. root radius).

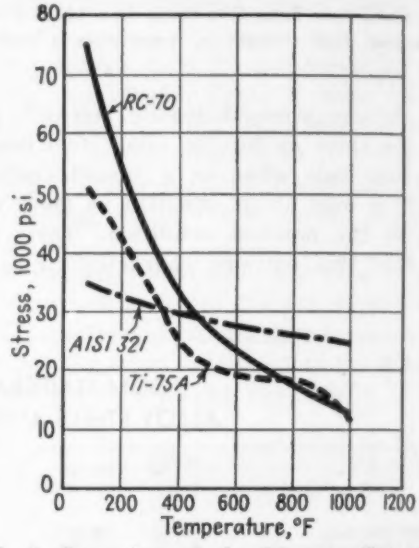


FIG. 9—Comparison of the 0.2 pct offset yield strengths v. temperature for two grades of commercially pure titanium and type 321 stainless steel.

increased section thicknesses to improve stiffness.

Other smaller parts, such as the Ti-150A rocker arms, push rods and turbine nozzle supports, must be finally evaluated by full scale tests to determine their suitability when made from titanium since there is no obvious reason why they should not function successfully. A potential weight saving of about 20 lb could be realized for this group of small parts.

In a turbo-jet or turbo-prop engine there is even greater opportunity for weight saving though the substitution of titanium for steel, since the compressor section, which accounts for a large proportion of the total engine weight, has a substantial portion of that weight revolving about the shaft. Under proper design conditions, for example, a reduction of 1 lb in a compressor rotor blade may save up to 5 additional pounds in supporting members. More important, the compressor section generally operates at temperatures within the scope of titanium.

Beginning with compressor rotor discs, represented by the L2748 titanium alloy disc shown in Fig. 4, yield strength vs. temperature is the most important general design criterion for

TABLE III

ANALYSIS OF TITANIUM AIRCRAFT ENGINE PARTS

Part Name	Material	Approx Wt of Finished Part in Lb	Approx Forging Wt / Finished Wt	Approx Cost of Finished Part	Approx Wt Savings from Use of Ti per Part and per Engine	Approx Cost of Weight Savings per Lb
Propeller Shaft	AMS 6412	53.0	3.0	$161.00	21 lb	$47.00
	Titanium Alloy	32.0		1155.00		
Crankshaft Front	AMS 6415	45.0	5.0	132.00	18 lb	73.00
	Titanium Alloy	27.0		1451.00		
Crankshaft Center	AMS 6260	61.0	2.5	142.00	24 lb	40.00
	Titanium Alloy	37.0		1097.00		
Crankshaft Rear	AMS 6415	32.0	3.0	74.00	13 lb	43.00
	Titanium Alloy	19.0		631.00		
Articulated Rod	AMS 6412	3.0	3.5	16.00	1 lb/part	82.00
	Titanium Alloy	2.0		98.00	16 lb/eng	
Master Rod	AMS 6412	17.0	6.0	67.00	7 lb	86.00
	Titanium Alloy	10.0		705.00		
Rocker Arm	AMS 6322	1.0	2.0	9.00	0.4 lb/part	55.00
	Titanium Alloy	0.6		31.00	14 lb/eng	
Turbine Support	AMS 6322	3.0	8.0	50.00	1 lb/part	194.00
	Titanium Alloy	2.0		246.00	3 lb/eng	
A typical Compressor Rotor Disc	AMS 6342	25.0	5.0	93.00	11 lb/part	58.00
	Timken 17-22A (S)					
	Titanium Alloy	14.0		737.00	143 lb/eng	
A typical Compressor Stator Blade	AMS 5613 (AISI 403)	0.06	2.0	3.00	0.02 lb/part	175.00
	Titanium Alloy	0.04		6.50	30 lb/eng	
A typical Compressor Rotor Blade	AMS 5613 (AISI 403)	0.10	6.0	5.00	0.04 lb/part	238.00
	Titanium Alloy	0.06		14.00	28 lb/eng	

determining the suitability of available titanium alloys for these parts.

While temperature rise through the compressor varies from one engine to another due to compession raio variations, a range of possible part temperatures from below zero to as high as 1000°F is of general interest. Fig. 5 compares the 0.2 pct offset yield strength of three titanium alloys with two alloy steels heat treated to properties typical of steel discs and one high strength aluminum alloy with good heat resistance. All properties have been adjusted to the density of titanium.

On the basis of short time tensile strength, the titanium alloys compare favorably with the alloy steels. The aluminum alloy becomes inadequate beyond about 350°F. However, short time strength comparisons give an unduly favorable picture of titanium alloy properties, since unlike steel, and even at room temperature, these alloys show relatively high creep rates for stresses as high as the 0.2 pct offset yield level. Fig. 6 indicates the relationship between the same titanium alloys noted with respect to the stress to produce 0.5 pct creep in 1000 hours at temperatures from 600°F through 1000°F. In contrast to any alloy steel which can be used on the basis of short time tensile properties through at least 750°F, none of the titanium alloys shown appear to offer suitable creep strength for compressor discs much beyond 700°F. Even then some of the weight advantage over steel may have to be sacrificed, depending upon the efficiency of the original design of the steel discs and the minimum section size to which a steel disc may be machined under practical conditions.

Limiting temperature for titanium

In spite of less than full returns from substitution of titanium alloys for steel, it has been found possible in a typical compressor of advanced type to save 121 lb from rotor discs alone, providing that titanium is also used to replace steel in rotor blades, thus lessening disc stresses appreciably.

It is considered reasonable to estimate that about 700°F to 750°F is a limiting temperature for the use of titanium alloy compressor blades, based on creep characteristics, even though blade length, and generally blade stresses, diminish toward the high temperature end of the compressor.

As in the case of connecting rods for reciprocating engines, the apparent tendency toward notch sensitivity of titanium alloys as compared to alloy steels points up the necessity for considerable care in producing titanium alloy blades with good surface finish. Well polished blades should provide good fatigue strength as noted in Fig. 7 where fatigue curves for two titanium alloys are compared with a typical stainless steel used for compressor blades. Fig. 8 indicates relative notch sensitivity for both of the titanium alloys illustrated, although to a lesser degree than for the Ti-175A.

The apparently detrimental effects of conventional shot peening practice on titanium may also imply that titanium blades may be overly sensitive to damage from nicks and scratches in handling or engine operation.

Creep properties limiting factor

Commercially pure titanium may find such uses in turbo-jets and turbo-prop engines as combustion chamber or compressor housings, bearing supports and heat shields fabricated from sheet metal. As compared with the use of carbon steel instead of stainless for alloy conservation, titanium is lighter, also nonstrategic, and has no need for a protective coating. Through 600°-700°F, it may usually be substituted for either carbon steel or stainless with a net saving in weight. In Fig. 9 two types of commercially pure titanium are compared to Type 321 stainless with respect to yield strengths through 1000°F. Again, however, creep properties, even at low temperatures, may control the design stress limits for titanium and in some cases where sheet metal structures are designed primarily for stiffness, the low modulus of titanium may be a further limitation to full weight savings.

Weights and costs detailed

Table III details some typical examples of engine part weights, weight savings through the use of titanium alloys, and where available, an approximate cost comparison of finished parts. With the current cost of titanium alloys at about $9.50 as compared to about .08¢ per lb for alloy steel, it is seen that the major factor of parts cost differential is in the high cost of titanium.

Experience to date has also dictated an addition of about 50 pct to forging cost and 100 pct to machining cost for the use of titanium alloys in parts instead of steel. The machinery problem is mode more acute in some cases by the relatively high ratios of forging to finished part weights in light weight engine parts.

While the present cost per pound of weight saved by the use of titanium instead of steel for engine parts is indicated to be between $50 and $100 for the heavier and more easily fabricated parts and $140 to $240 for light, precision parts such as compressor blades, we do not propose that these figures be used to discourage the proper application of titanium to aircraft engines. They merely emphasize the pressing need for cheaper production methods.

Mr. Hanink's article is based on his paper *"Application of Titanium to Aircraft Engines,"* delivered at the National Aeronautic Meeting of the Society of Automotive Engineers in New York, April 21-24, 1952.

Does tough job better, faster—

Abrasive belt machine GRINDS JET BLADE AIRFOILS

By George Elwers
Machinery Editor

Four cams control this machine which grinds jet engine blade airfoil sections with an abrasive belt. One cam is the airfoil master. Another keeps belt contact normal to surface at point of grinding. A third gives compound motion at blade roots. The fourth cam keeps cutting speed nearly constant. One operator can handle several of these machines. Grinding a typical blade takes only 4¼ min.

A new machine has been developed to help speed production of jet engine blades and buckets. Its job is the tricky one of grinding the airfoil surfaces of jet engine gas turbine buckets and compressor blades. It is capable of finishing a typical twisted bucket in a 4½-min cycle.

All-over grinding of airfoil sections has not been done on all engine designs in the past, but is becoming more and more common, especially as designers discover all-over grinding insures blades can be produced to exactly the same shape and tolerances. Since millions of blades are required by our Air Force expansion program, this growing use of ground airfoil surfaces has stimulated development of faster methods of doing the job. The new machine is fast, automatic, and requires a minimum amount of relatively unskilled labor.

Developed by Pratt & Whitney Div. Niles-Bement-Pond Co., the machine is designed to grind twisted profile sections of airfoils to close and consistently uniform tolerances. Completely automatic, it is capable of finish sizing the entire airfoil surface of blades, including the leading and trailing edges, at high production rates. A single attendant can serve a row of machines.

The machine operates on the duplicating principle and uses high-speed abrasive belts for precision stock removal. The contour is formed on the work by copying and airfoil master, using the familiar principle of the gunstock lathe. The use of coated abrasive belts for stock removal has eliminated the otherwise complicated problem of maintaining proper tracer wheel and grinding wheel size relationship. Further, a grinding surface equivalent

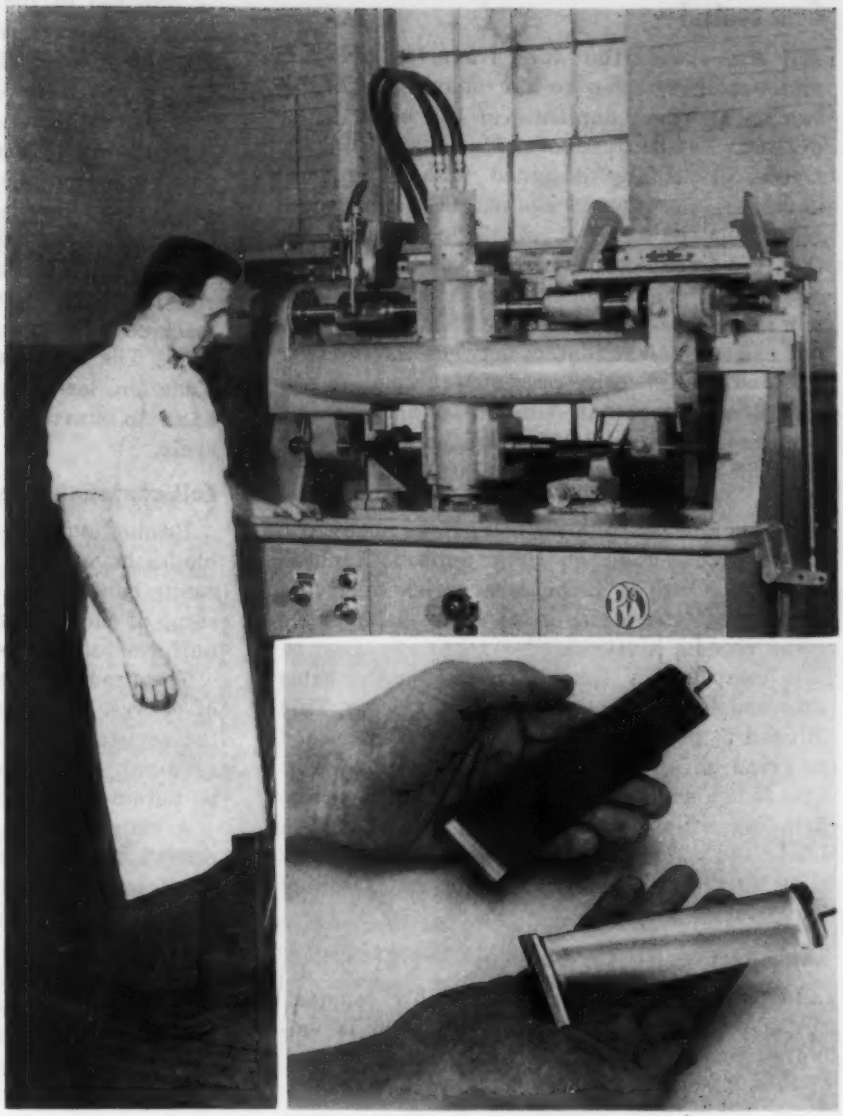


FIG. 1—Abrasive belt grinder for jet blade airfoil sections. Work frame, top, has four spindle stations. Blade is at lower left station. Airfoil master cam is at lower right. Velocity cam is at upper left station. At upper right are wave cam and compounding cam. Insert shows typical compressor blade forging, top, before grinding. Same blade after grinding airfoil section is shown at bottom. Turbine buckets often have more twist than this compressor blade. Sizes and shapes vary widely. (Pratt & Whitney Turbine Blade Airfoil Grinder: Patent applied for.)

to a wheel circumference of 90 in. is thus provided by the necessary small-diameter contact wheels needed to grind the concave surface of the airfoil.

The machine is shown in Fig. 1. It is composed of a main frame with a traversing carriage on top, mounted on a ball bearing slide. A pivoting work frame is suspended on two ball bearings, housed and fastened to the carriage. The work frame is free to swing down until positioned by a third point of support: The airfoil master against its follower roll. Rotation of the airfoil master thus moves the work frame in and out in conformity with the contour of the master.

The traversing carriage, operated by hydraulic piston, moves the frame throughout the length of the workpiece. The central horizontal beam, or table, between the uprights of the main frame, carries two units, each with a vertical axis. One carries the follower roll, the other the contact wheel for the grinding belt as well as the belt driving system.

The work frame contains four spindle stations, geared and powered by a variable-speed hydraulic motor, to rotate the workpiece and generating cams. The lower left station is the workholding spindle. The blade is placed in a quick-loading fixture, designed to hold the foot end of the blade. The outboard end of the blade is supported by a live center.

The principal and most essential cam is the airfoil master, located at the lower right spindle station. It rotates simultaneously with the workpiece. This cam rides against the follower

TYPICAL CYCLE

Blade 1½ in. wide, 4½ in. long. Total twist 25°. Concavity, ⅞-in. radius.

Effective rotation	36 rpm
Lead	⅛ ipr
Traverse time	1 min
Grinding time, for four traverses	4 min
Loading and unloading time	¼ min
Total cycle time	4¼ min

Cam control—

roll and causes the work frame to swing in and out in relation to the shape desired. It can be an exact duplicate of the blade shape desired. But because most blades are thin, the master is usually designed with a uniform envelope to stiffen it against deflection when resting on the follower roll. To compensate for this, the follower roll is made smaller.

For best grinding efficiency and surface finish, it is essential to have the grinding contact, and the equivalent contact between the follower roll and master cam, presented normal to the airfoil surface at all times. To provide this continuous contact on the twisted shapes that exist on the variety of compressor and turbine blades, swiveling action of both the grinding belt axis and the follower roll axis is necessary. This swivel action on both units is induced and synchronized through a series of levers and linkage from the wave cam at the upper right spindle station.

A compounding cam is located on the same axis and just to the right of a wave cam. This is used to produce the diagonal motion needed to grind parallel to the root of a blade whose axis is not perpendicular to its base. When the grinding action approaches the root of such a blade, the compounding cam adds a short shuttling action to the hydraulically actuated traverse.

Roll operates teeter bar

In order to maintain a reasonably constant surface cutting speed, a velocity cam is employed to vary the rpm during each revolution of the grinding spot around the profile. The follower roll on the velocity cam, which is located at the upper left station, operates a teeter bar. This in turn opens and closes a flow control valve in the hydraulic line supplying the motor drive to the work spindle. Thus the rotation is varied to cause the leading and trailing edges of the blade to pass the grinding wheel faster than the concave and convex surfaces, since at these edges a large proportion of the revolution is required while only a small proportion of surface area presents itself to the grinding wheel. The velocity cam is not essential for accuracy, but speeds up the overall grinding cycle.

The traverse cylinder is fed with pressure oil from two lines. One line comes from the pilot reversing valve which is operated at the ends of the pre-set stroke. The second line feeds through an ordinary manual 4-way valve for manual traverse of the work frame carriage. This manual rapid travese is used when setting up a job.

Setting for finish size of the blade is accomplished by moving the master follower roll relative to the fixed grinding idler, allowing the work to swing in further. A manual adjustment is provided in the dovetail slide, on which the master follower roll is mounted. Automatic in-feed is controlled by a feed cam, which moves the follower roll at the end of each traverse stroke and positions the slide to take the final sizing pass during the last traverse. The feed cam operates a stop switch, which is set to stop the machine automatically at the end of the grinding cycle.

Once the machine is adjusted for production runs, a machine loader can tend a group of machines, the number depending on the cycle time. The operator simply unloads the finished blade and loads a new piece, sets the feed cam knob to starting position, and starts a new cycle.

Foil contour easily held

Production tests on 12-pct chrome steel jet blades have shown that the foil contour can be easily held within a tolerance of 0.003 in. after setup of the machine, all blades are produced to uniform tolerances.

The production rate of the machine depends, of course, on the size and shape of the blade, the accuracy of the blade blank and the finish required. However, an approximate idea can be obtained by considering the following:

A roughing pass with a finishing belt will remove from 0.002 to 0.006 in. on a side per traverse. A finishing pass will remove 0.001 in. per side. Rough milled blade blanks with a maximum envelope of 0.010 in. can be roughed and finished in four traverses. The lead of the traverse over the work usually is about ⅛ in. per revolution of the blade.

The effective rate of work rotation depends on the periphery or length around the profile, the rate of grinding spot travel; the degree of twist, or rate at which the sweep must swing back and forth; and the degree of concavity. It is necessary to keep the rate of rotation slow enough to give sufficient time for the belt to cut in the concave and convex portions, and speed up the rotation at the leading and trailing edges to a value 8 to 10 times as high.

One man could handle several machines

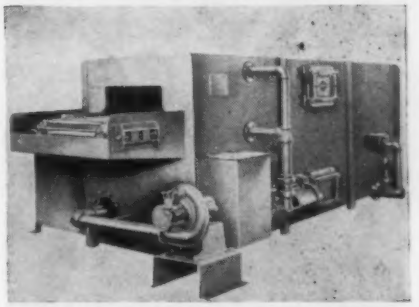
A blade 1½ in. wide, 4½ in. long, with a total twist of 25° and concavity with ⅞ in. radius can be completed in 4.25 min. Because the cycle is automatic, one operator in this instance could theoretically handle 17 units. A practical figure would be nearer six machines, showing a labor cost of less than 1 min. per finished blade.

Under ordinary conditions of wet grinding, belt life is in the vicinity of 10 to 20 blades, depending on such factors as size of blade, material, finish, and type of belt. Belt changing time is 0.25 minutes, which when broken down to a per-blade basis would then be 0.25 to 0.012 min. Belt cost breaks down to less than 1¢ per blade.

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 131 or 132.

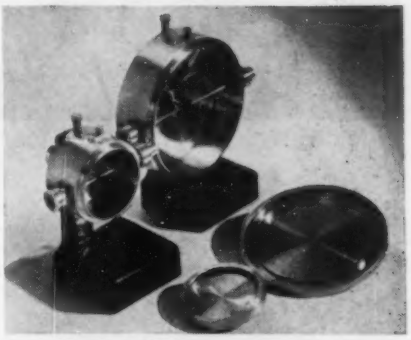
Machine washes sand from foundry flasks



Sand can be removed quickly, completely and mechanically from steel foundry flasks by a special washing machine that utilizes a super-spray cleaning system. The flasks pass along on a bar type conveyer through consecutive high-pressure, fan-shaped curtains of cleaning solution from above, below and both sides until the flask is free of sand. The cleaning solution, in re-circulating through the machine, flows very slowly through a Slo-Flo tank. In this way sand settles out of the solution before it reaches the screen tank which removes foreign particles. *Alvey-Ferguson Co.*

For more data circle No. 18 on postcard, p. 131

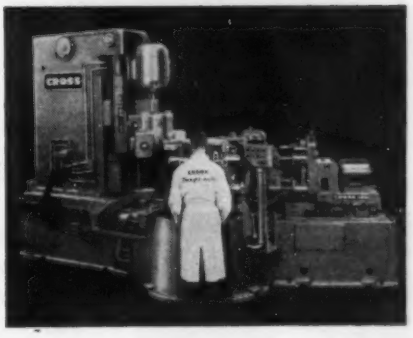
Powder cameras for X-ray diffraction



Two new X-ray diffraction powder cameras, available in sizes 114.59 and 57.3 mm diam, will record up to 17 Angstrom spacings with copper radiation, with low air scatter and unusually clear patterns in the forward reflection region. Adaptable to almost all makes of standard X-ray equipment, the cameras can be adjusted to fit most conventional tracks. They are easily aligned with X-ray beams; collimators are interchangeable; snap-on light-tight covers are easily removed and replaced; and the cameras use standard 35 mm film. Their higher intensities require shorter exposure time. *North American Philips Co.*

For more data circle No. 19 on postcard, p. 131

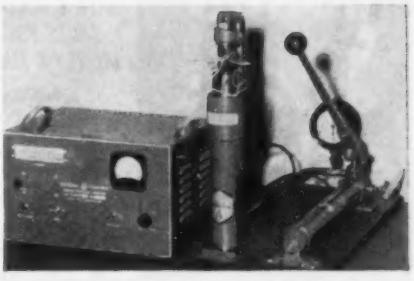
New machines process intake manifolds



Intake manifolds are processed in two operations on a pair of new special machine tools. The first operation consists of milling the angular mounting pads and drilling the mounting holes. The second includes milling the choke pad, carburetor pad and water pipe connection; boring the water hole and carburetor holes; drilling, chamfering, reaming and tapping all other holes. Production is at the rate of 50 pieces per hr at 100 pct efficiency. The first machine (illustrated) is a dial type utilizing the Cross heavy duty index table. The second is a Transfer-matic with parts automatically transferred from station to station. *Cross Co.*

For more data circle No. 20 on postcard, p. 131

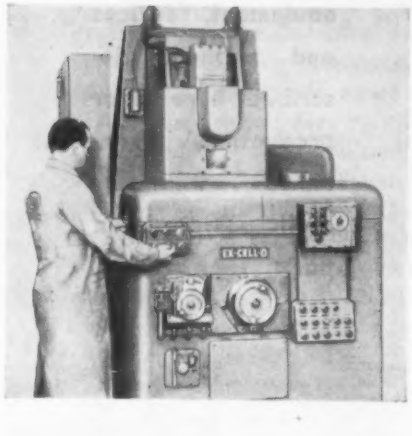
Measured resistance to produce better bond



New surface-resistance indicator helps to produce a better resistance welding bond by providing a rapid and accurate measurement of the resistance between pieces of metal to be welded. The instrument supplies a simple check on pre-welding cleaning processes, upon which surface resistance of the metal depends. It consists of two parts: a microhmmeter and a sample holder. Two ranges cover 0-200 and 0-2000 microhms. *General Electric Co.*

For more data circle No. 21 on postcard, p. 131

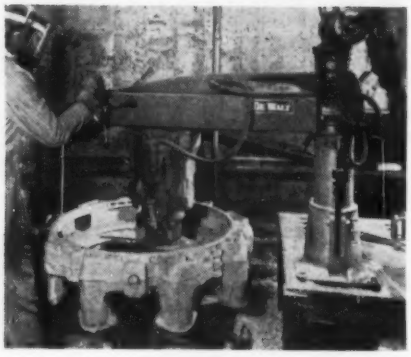
Turn Page



Machine grinds jet engine blades, buckets

A precision surface form grinder grinds flat, grooved or curved surfaces on the roots of jet engine compressor blades and turbine buckets. Machining cycle is fully automatic. Machine base is heavy and rigid to insure accurate work and a good finish. A reciprocating work table is hydraulically operated and electrically controlled. It accommodates removable work fixtures designed to suit the individual blades or buckets. Work may be left in the fixtures for subsequent operations. A motor-driven, cam type diamond dresser shapes the grinding wheel for the desired form. Dressing is part of the automatic machine cycle, but the dresser may be controlled manually for setting up a new wheel or adjusting the cam. All controls are within easy reach. *Ex-Cell-O Corp.*

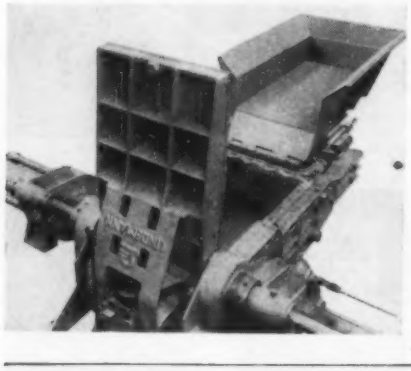
For more data circle No. 22 on postcard, p. 131



Metal-cutting machines do heavy duty cutting

New heavy duty metal cutting equipment to assist in speeding production in the defense program include one metal cutter, the ME-2F 10 hp foundry sprue-cutting machine that is capable of heavy foundry operations. It will cut risers up to 4 in. diam on iron castings and risers up to 2 in. diam for nickel and steel castings. A companion metal-cutter the ME-6 15-hp dual column cutting machine is used for heavy cutting. In one application, it can cut stainless steel plate 2 in. thick x 96 in. wide. A 10 hp metal cutter specializes in cutting billets, heavy tubing or various sections for cutoff operations. A range of machines is available for cutting plastics, nonferrous metals. *De Walt, Inc.*

For more data circle No. 23 on postcard, p. 131



Scrap baling presses have high output

High-capacity scrap baling presses built by Lindemann of Düsseldorf have two basic designs, the shearing ram type and the pressing-lid type. Continuous feeding features the shearing ram type which is adaptable to fully automatic operation. It combines the functions of a scrap shear and a baling press. Preliminary shearing or oxygen cutting of bulky scrap is eliminated. Bale capacities range from 80 to 950 lb. The pressing-lid type provides triple compression with feed hopper. Smallest model produces 265-lb bales at rates to 58 per hr; the largest, 800-lb bales at rates up to 52 per hr. *Kurt Orban Co., Inc.*

For more data circle No. 24 on postcard, p. 131

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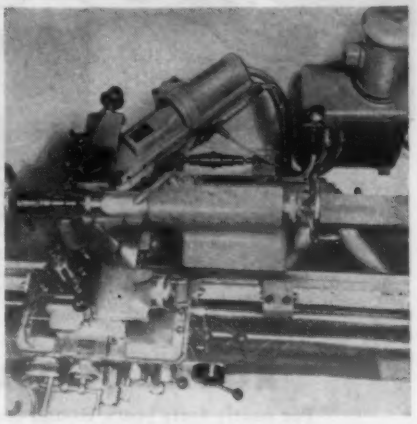
Converts lathes to tracer controlled machines



A new Swiss hydraulic copying attachment, the Bondycop, makes it possible to turn almost any lathe into an automatic tracer controlled machine. Mass production is practical even for small batches because setting takes so short a time. The attachment need not be removed when not in use as it does not hamper function of the lathe for uses other than copying. For a pattern, the Bondycop uses either the first piece of a batch, or a jig, and chance of error is reduced to a minimum since the operator controls only one measurement. Bondycop will copy angles of 90° in the direction of the headstock, allowing a heavy cut to insure a smooth surface and save grinding operations. Standard size can be used for diameters to 6 in. *Morey Machinery Co.*

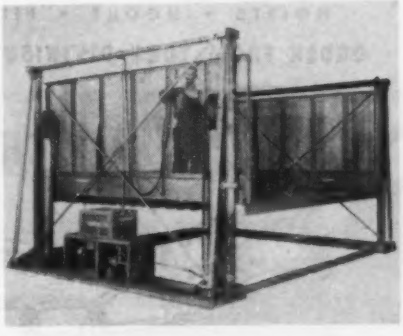
For more data circle No. 25 on postcard, p. 131

Drill press has ½-in. capacity in cast iron

A redesigned line of 15-in. drill presses with ½-in. capacity in cast iron will drill to the center of a 15 in. circle. Spindle travel is 6 in. or 4¼ in. The 6-in. spindle travel model is completely new and incorporates a calibrated depth gage and a micrometer type depth stop. All models feature enclosed motor switch housing built into the head casting. Belt guards are made of lightweight, strong steel stampings and are standard equipment. New machines have six-spline spindle, independently mounted spindle pulley and one piece head castings. Four speeds range from 600 to 5000 rpm. Bench, floor and multi-spindle models are available among 72 different models of this machine. *Walker-Turner Div., Kearney & Trecker Corp.*

For more data circle No. 26 on postcard, p. 131

Lifters facilitate loading of trucks and cars



Heavy loading of trucks and railway cars is facilitated by use of new Electraulic four post lifters. They are fitted to level-to-level and floor-to-floor movement of trucks and skids, materials, heavy parts in plants or warehouses; are electric-hydraulic powered and designed for continuous operation. Safety features include: minimum safety factor of four used throughout the lifters; deadman type push-button controls; expanded metal platform guards; safety tread non-skid steel platforms. Capacities range from 2000 to 12,000 lb. Lifts range from 5 to 7 ft. *Service Caster & Truck Corp.*

For more data circle No. 27 on postcard, p. 131

Turn Page

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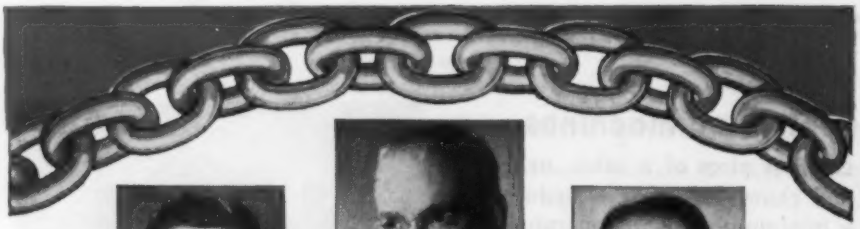

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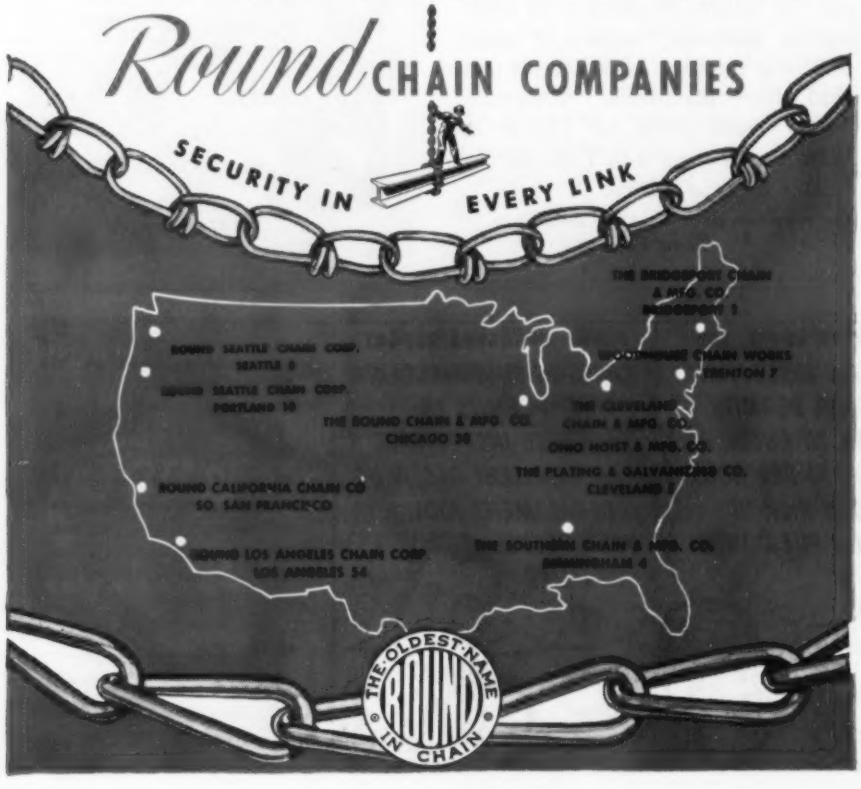
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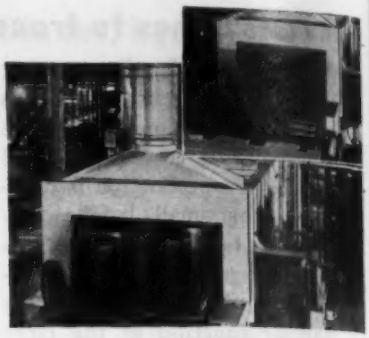
—New Equipment—

Continued



Drum processing

To prepare drums for painting a spray-type processing machine operates through nine stages comprising alkali wash, sulfuric acid pickling and phosphate coating. Drums can be processed both inside and outside. Interior processing requires that drums go through the machine before the ends are welded in. Advantages of this type method are: operations are fast and require less man-power; all processing in one machine results in smoother, better controlled operations and more uniform product. Enclosed operations eliminate hazards from fumes, odors, splashes. Basic principles of the machine are adaptable for the processing of any product. *Morrison Industries, Inc.*

For more data circle No. 28 on postcard, p. 131

Jig and fixture system

The Wharton universal jig and fixture system consists of 450 various-shaped, graduated elements, bases and fastening devices which when assembled in certain combinations and numbers, dictated by the requirements of a particular machining job, build up into an extremely rigid and accurate jig or fixture. All important dimensions are held to 0.0003 in. and square to 0.0006 ipf. A precision structure can be built up by unskilled hands in less time, it is reported, than it takes to make a setup on the machine bed. Fixture, after use, may be dismantled and its elements reused in other layouts. This makes jig and fixture obsolescence a thing of the past. *Wharton & Wilcocks of America, Inc.*

For more data circle No. 29 on postcard, p. 131

Turn Page

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Continued

Cleated belt conveyer

Low-cost portable power conveyer for handling light stampings, screw machine products, scrap, and similar press-room and machine-shop material speeds up plant operations by maintaining a smooth flow of goods from production machines to tote boxes. The Press-Veyor Jr. is 4, 6, and 8 ft long with 4, 8, and 12-in. belt widths. Steel bed and guard rails are formed in one piece. Woven cotton, Neoprene, or waterproofed woven cotton belts have steel cleats spaced on 24-in. centers. Belt speed is 55 fpm. *Rapids-Standard Co., Inc.*

For more data circle No. 30 on postcard, p. 131

Truck overhead guard

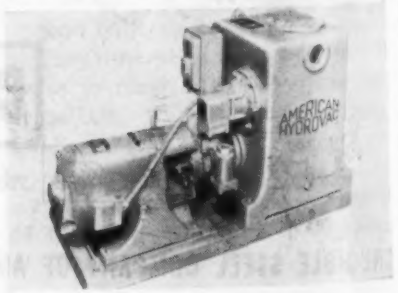
For installation on Yak and Yank lift trucks a new overhead guard has an overall installed height of 95 in. When necessary, the height may be reduced to 91 in. The canopy is pivotally attached to the lifting mast and pivotally supported from the lift truck dash. Method of securing permits the guard to remain horizontal, regardless of the degree of lifting-mast tilt. *Mercury Mfg. Co.*

For more data circle No. 31 on postcard, p. 131

Boiler feed unit

The unit is streamlined comprising a high pressure motor driven turbine pump mounted on a cast iron drip type sub-base and a lifetime cast iron receiver. Makeup water is controlled with a McDonnell & Miller No. 21 assembly and the cast iron receiver is fitted with a builtin strainer for the return line. *American Hydrovac, Div. Pitz Foundry, Inc.*

For more data circle No. 32 on postcard, p. 131



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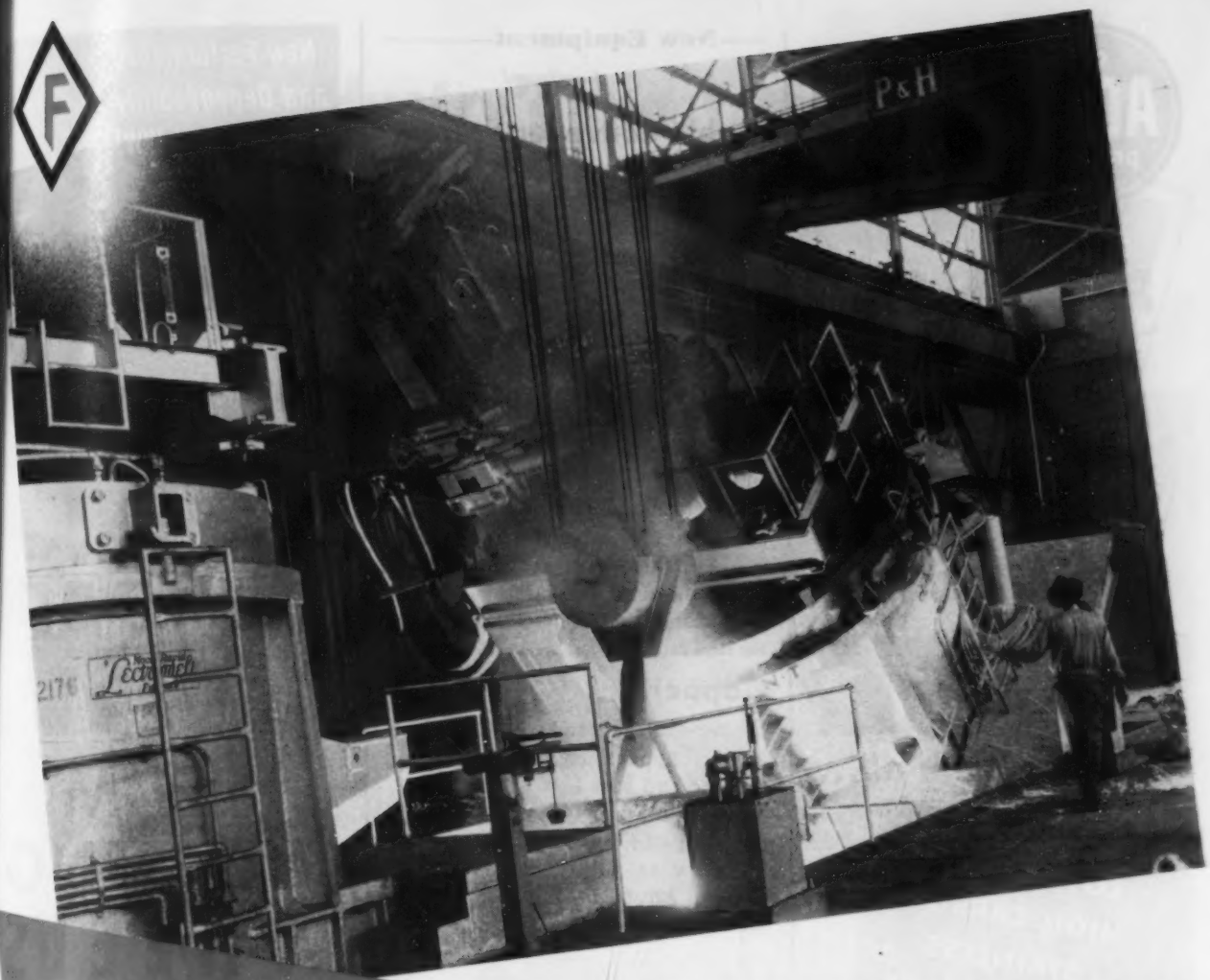

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—New Equipment—

Continued

Cable conveyer system

Overhead monorail cable conveyer systems for heavy duty and lightweight materials handling purposes use 9/16-in. steel core cable in joining trolley brackets. This was made possible by development of the split nut and trolley bracket assembly. The split nut exerts a concentrated 360° compression on the cable as it is turned on the expanding tapered threads of the bracket sleeve. The sleeve under the tremendous pressure of the nut envelops the cable with a biting grip. Bracket remains in fixed position, assuring lasting operating efficiency. *Daigle-Gaboury, Inc.*

For more data circle No. 33 on postcard, p. 131

Capacitors

Drawn-oval capacitors for electronics applications are stronger, smaller and cost less than the rectangular units. They are available in ratings of 600 to 1500 v dc, 330 to 660 v ac and 2.0 to 10.0 muf. *General Electric Co.*

For more data circle No. 34 on postcard, p. 131

Two tools in one

A new lathe tailstock centering device and taper turning attachment is manufactured in two sizes: with a No. 2 Morse Taper shank and with No. 3, 4 or 5 Morse Taper shank. The attachment fits into the lathe tailstock, eliminating special fitting or machining for immediate use. Micro screw with graduations actuates the 60° center in either direction with a positive lock at any position desired. The tool turns tapers up to 3 ipf, using the graduations indicated on the face plate. *Master-Taper Co.*

For more data circle No. 35 on postcard, p. 131

Turn Page

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Seam welding wheels of any size are available in Weiger-Weed high strength, high conductivity alloys. To facilitate delivery, Weiger-Weed normally maintains a basic stock of many sizes of wheel blanks in finished form, or in rough form for user to finish machining. Generally, users find it more advantageous to order wheels completely finished.

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THERE is no one cutting fluid that best meets the requirements of every job. Therefore, Stuart offers you a *complete* line of cutting fluids. Often two or three Stuart cutting fluids, or varying dilutions of one or two, will answer all the needs of a shop. But, what a whale of a difference it makes when the cutting fluid that is used is the right one for the job!

GEAR SHAVING TOOL LIFE INCREASED 50%, FINISH IMPROVED WITH STUART'S THREDKUT

In a Chicago plant, two gear shavers were run side by side on the same job, one with the old cutting oil, one with Stuart's THREDKUT. Tool life with "x" oil — 6000 gears; with THREDKUT—*9000 gears!* Finish with the other oil—satisfactory until 2500 to 3000 gears had been produced, then deteriorating until tools were replaced; with THREDKUT—completely satisfactory at all times.

It pays to put the *right* cutting fluid on the job. Ask to have a Stuart sales-engineer call.

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——New Equipment——

Continued

Drum seamer

Double end and double seamer for steel drums simultaneously seams lids and bottoms. The lid is pressed on pneumatically. Variations in body heights are automatically compensated. Machines are available for sheet thickness up to 16 gage, for diameters ranging from 8 to 32 in. and for heights from 12 to 44 in. Production per hour is up to 240. *Transmares Corp.*

For more data circle No. 36 on postcard, p. 131

Metal powders

An advance in metal powder processing eliminates oxidation and results in improved mixing characteristics and die life. As a result of the new technique, fabricators of powdered metal parts reportedly will obtain more uniformity of part size characteristics during processing, faster and more complete alloying action and decreased molding pressures. Mixing characteristics imparted to Glidden metal powders by the process are improved by the elimination of the tendency to lump. *Glidden Co.*

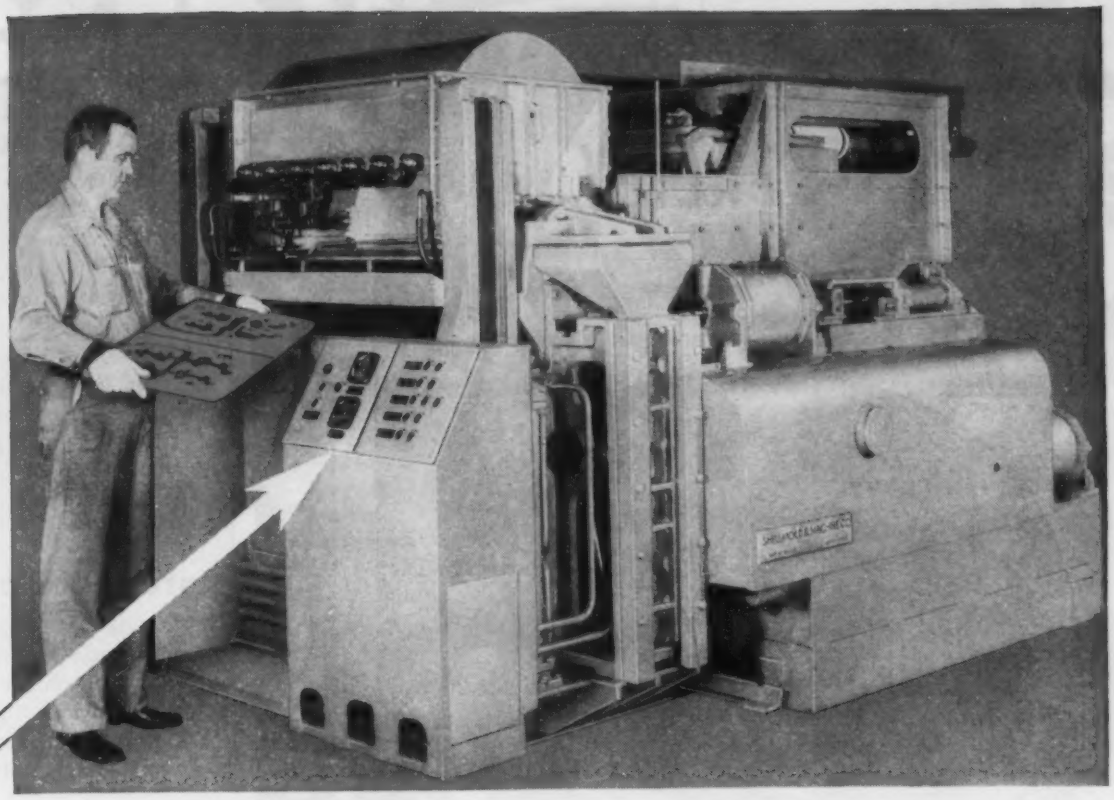
For more data circle No. 37 on postcard, p. 131

Protective coating

Smokestacks, furnace walls and other applications requiring high heat-resistance can be protected with Lankote 620, a silicone-aluminum paint that can be easily brushed or sprayed, and will protect against corrosion, deterioration and weathering at temperatures up to 1000°F. *J. Landau Co.*

For more data circle No. 38 on postcard, p. 131

Turn Page



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_____ — curing time

_____ — pattern temperature

_____ — spraying time

_____ — stripping speed

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Scrap eliminator

Designed for use with the Fried Stripveyor or Liftveyor, a scrap eliminator transforms a shear operation into a mechanized production line setup by allowing the operator to handle everything including the shearing operation, movement of the sheet, and discard of trims. All movement can proceed at the maximum production rate of the shear. *Fried Steel Equipment Mfg. Corp.*

For more data circle No. 39 on postcard, p. 131

Rotary actuator

Lightweight rotary actuator for driving flexible shafting in remote-operating mechanisms operates on 220 v, 400 cycle, 3 phase ac. Motor of the unit operates at all altitudes up to 50,000 ft and through ambient temperature range from −65° to +200°F. Output is rated at 13 lb-in. at 2900 rpm of the output shaft. *Hydro-Aire, Inc.*

For more data circle No. 40 on postcard, p. 131

Motor tester

A portable electronic winding tester can detect a single shorted turn of No. 40 AWG wire. The instrument is designed to detect faults in and to prevent breakdowns of electrical motors and generators of all sizes and types, coils, and similar electrical equipment. The PMD test probes generate their own field in the probes. High sensitivity makes possible the detection of a single shorted turn in a winding. *Columbia Technical Corp.*

For more data circle No. 41 on postcard, p. 131

Electric drills

Choice of seven speeds is offered in new portable electric drills. Three styles are available: pistol grip, spade handle and center contour handle designs. Ample operating freedom is gained through compact size and a weight of 3½ to 4 lb. Lightweight aluminum construction is coupled with balanced armatures and precision match gears to reduce tiring vibrations. *Mall Tool Co.*

For more data circle No. 42 on postcard, p. 131

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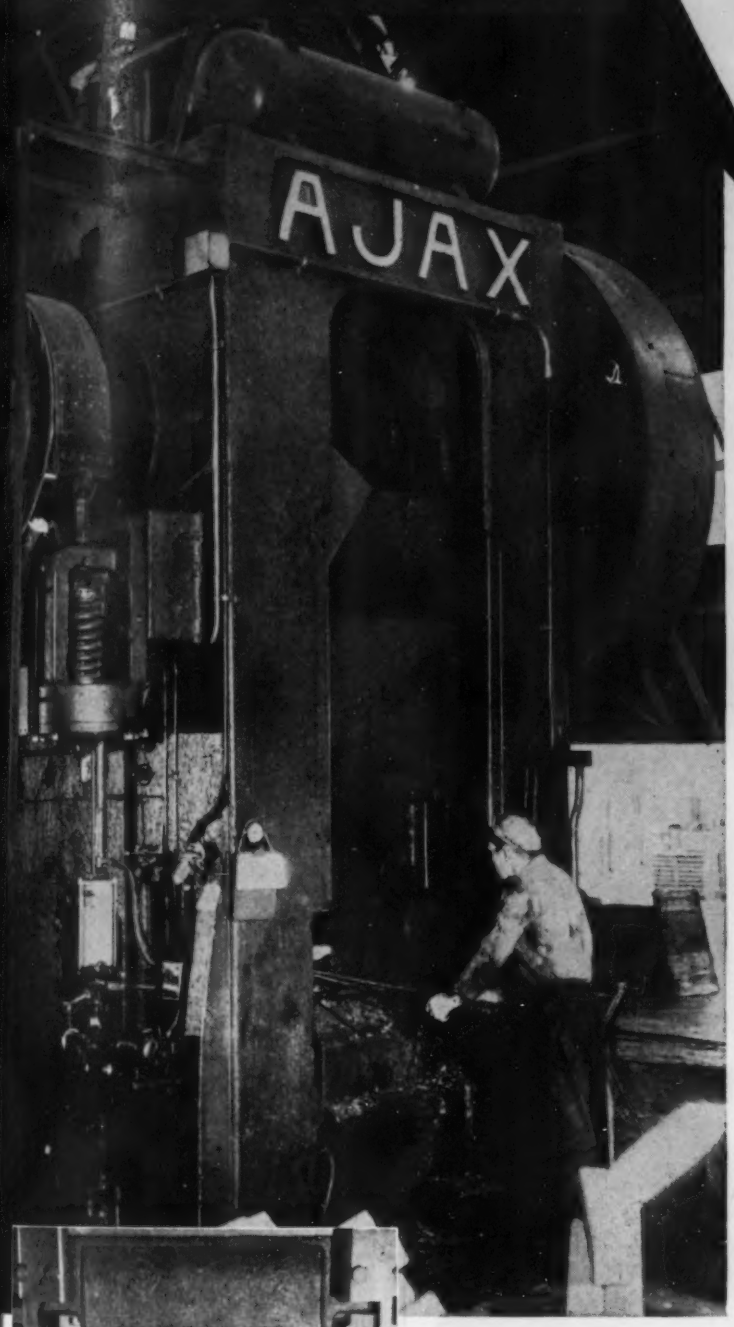
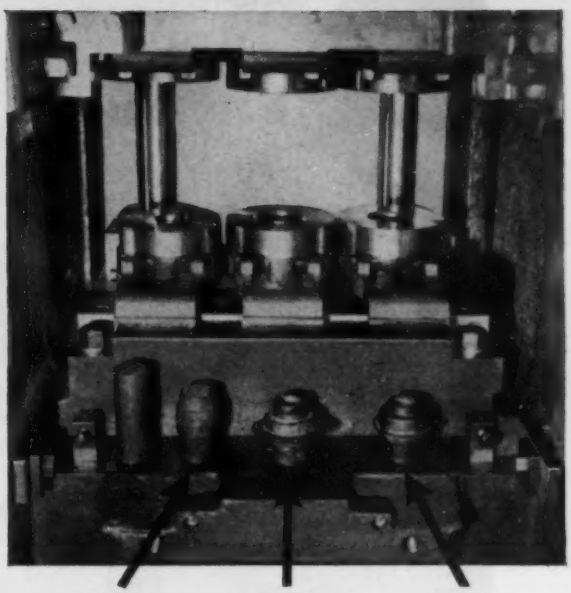
FORGED IN AJAX PRESSES





BUSTER OPERATION | FINISHED FORGING | BLOCKER OPERATION

The progressive forging operations necessary for forming gear blanks for heavy trucks are shown in the foreground. Above, the dies mounted in a 1600 ton press, are in the following order: buster die on the left, blocker die on right and the finish forge die in the center. Each operation is shown in front of the die it is formed in.

Shown here are the dies and bolsters mounted in a 1600 ton press. The product, a heavy automotive connecting rod, is pictured in the foreground.

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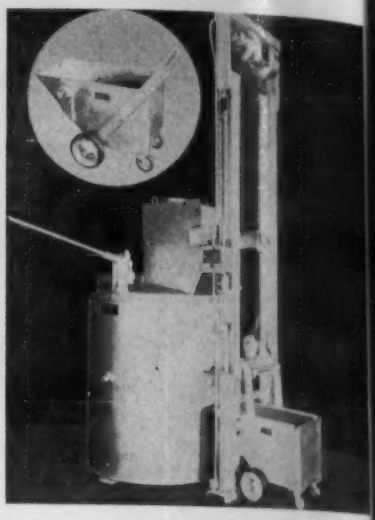

Metal loader

Adaptable to any melting pot, an automatic metal loader speeds up all types of metal melting. A detachable cart raises load of metal, dumps it and returns to loading position. It eliminates all heavy hand loading and obnoxious fumes common to the usual manual operation. It is standard equipment for Kemp's line of immersion melting pots. *C. M. Kemp Mfg. Co.*

For more data circle No. 43 on postcard, p. 131

Motor device

Changing rotation and voltage within a few seconds is possible with a new device incorporated in Brown-Brockmeyer capacitor motors. Called the Rota-Volt selector, the device permits changing voltage of a motor from 115 to 230 v, or vice versa, and shaft rotation from clockwise to counterclockwise in about 10 sec. It provides four different combinations in rotation and voltage from one standard motor. The inbuilt, foolproof feature locks in position. *Brown-Brockmeyer Co.*

For more data circle No. 44 on postcard, p. 131

Scale remover

Scale forming in pipes, evaporators, condensers, heat exchangers, water heaters and coils can be safely and quickly removed with Rydlyme solvent. Rydlyme is noncorrosive, has fast-dissolving qualities. *Apex Engineering Co.*

For more data circle No. 45 on postcard, p. 131

P&H OVERHEAD CRANES

Hold us COMPLETELY RESPONSIBLE!

P&H is the only crane builder producing complete electrical equipment for overhead cranes. P&H electric motors are designed specifically for crane service — for frequent reversal, with ample safety factor. P&H crane controls are designed for a single purpose — to insure the perfectly coordinated performance to meet your job requirements — and keep it that way! When you specify P&H crane electrical equipment, you can look to this one dependable source for complete service. There are no delays — no buck-passing. P&H — America's leading crane builder — welcomes this complete responsibility!

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*T.M. of Harnischfeger Corporation for electro-magnetic type brake.

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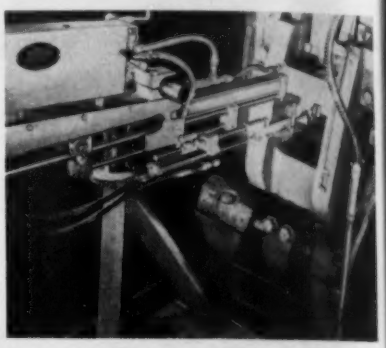
—Technical Briefs—

Unloader:

Small portable unit designed to remove press stampings.

A portable unloader has been designed for small and medium sized presses to remove stampings from dies automatically. The device, a smaller development of the Sahlin Iron Hand, may be used where other ejection methods are impractical.

The portable machine can be adjusted up and down to reach various die levels and be set up at any angle required. Jaw travel is in a straight line and is especially suited for the removal of small parts at high speed. The unloader is actuated by air cylinders and electrical controls.



PRESS UNLOADER works with motion movement of press ram. Arm moves into press at right moment and lifts stamping from die.

When the press ram descends and completes the forming or shearing operation, the steel jaw of the unloader moves into the die and takes a firm hold on the stamping the moment the ram rises sufficiently. The jaw lifts the stamping, moves back out of the die and drops the stamping in a tote box or on a conveyor.

Jaws Vary—Gripping jaws are designed to handle a variety of special unloading conditions. They include a hook type for application where a gripping edge is lacking; a neoprene-tipped grip to protect parts with special finishes; a pivot-type which can be swiveled laterally to clear tight die areas; and a confined type which locks a vertical flange stamping without damaging edges.

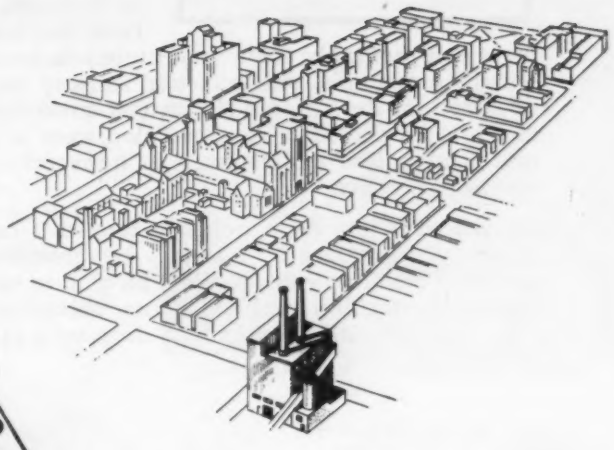
Turn to Page 152

STEAM CENTER for a Medical Center

The new steam center of the Medical Center Steam Company, serving the University of Illinois and others in the Medical Center Area in Chicago provides a single, economical and reliable source of steam for all buildings in the group.

Three boilers, each with a capacity of 90,000 pounds per hour, distribute steam through underground pipes laid in 4600 feet of tunnels. Provision has been made for future expansion.

The steam plant and distribution system were designed and constructed by Stone & Webster Engineering Corporation.



STONE & WEBSTER ENGINEERING CORPORATION

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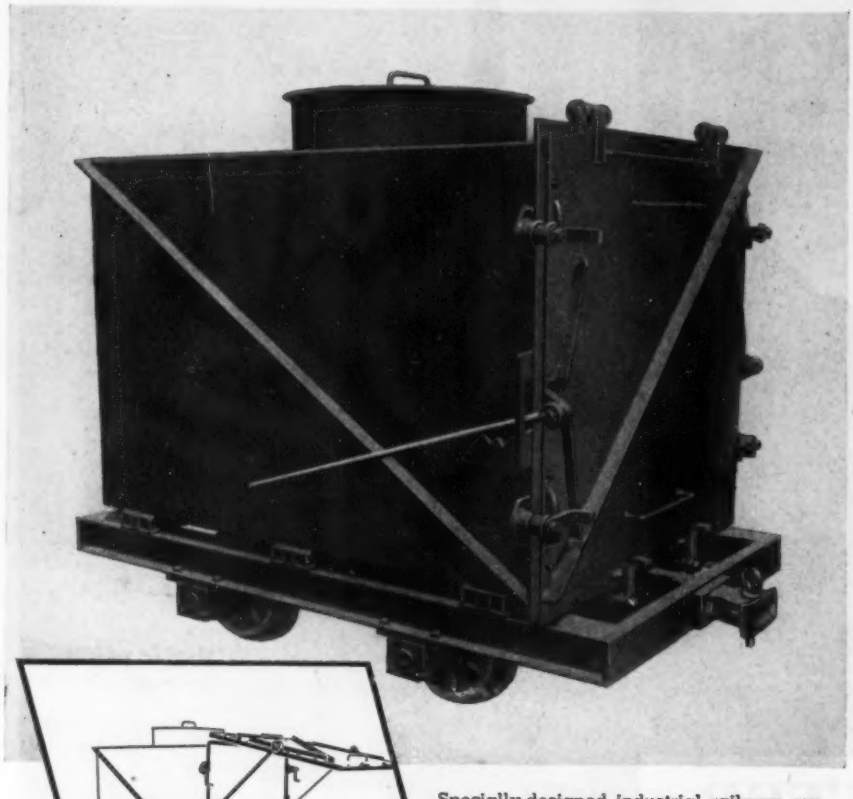

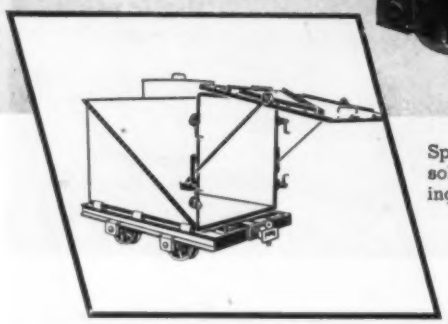

Specially-designed industrial railway car solves corrosion problems in transporting smokeless powder mixed with water.

● Whether your plant's in Timbuktu or Toledo, Penn Iron special equipment can *profitably* solve your materials handling problems. For example, this industrial railway car, specially designed for the Chinese Nationalist government on Formosa, is fabricated of stainless clad steel to last longer and require less maintenance in transporting a highly corrosive product.

On job after job, Penn Iron has *proved* it can improve handling operations . . . simply by designing a more practical handling vehicle. We'll be glad to analyze your materials handling problem at no obligation. To save time, cut costs and boost output, drop us a line for more information, now.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC. MEMBER FEMA

PENN IRON WORKS, INC.

READING, PENNSYLVANIA

—Technical Briefs—

Cobalt:

Radioisotope tracer used to study porcelain enamel coatings.

Sensitive radioisotope tracer methods are used by the National Bureau of Standards to study the effect of cobalt oxide on the adherence of porcelain-enamel to iron.

NBS found that a metallic cobalt layer was formed at the enamel-metal interface and that near the interface the enamel layer was depleted in cobalt oxide.

TABLE

RADIOACTIVE COBALT-BEARING ENAMEL

Specimen	Firing treatment	Counts per minute
1	U	180
2	U	199
3	N	1708
4	N	2345
5	O	2750
6	O	2685

*U = Underfired, 4 minutes at 1450° F
N = Normally fired, 4 minutes at 1575° F
O = Overfired, 6 minutes at 1750° F

The amount of cobalt that migrated to the interface increased with increased firing. Total quantity, however, was extremely small.

In the NBS investigation, small specimens of 18-gage enameling iron were coated with a porcelain enamel to which radioactive cobalt oxide had been added. After either underfiring (4 minutes at 1450°F), normal firing (4 minutes at 1575°F), or overfiring (6 minutes at 1750°F), the specimens were deenameled with molten sodium hydroxide.

Dissolves Enamel—The sodium hydroxide readily dissolves the enamel and partially dissolves the iron oxides present at the interface, but the metallic iron and cobalt are not affected.

After measurement of radioactivity of the specimens with a Geiger-Müller counter, the iron oxide layer was removed by agitation in sodium citrate solution (which does not affect metallic cobalt), and the radioactivity again counted. These measurements, see Table, indicate the amount of cobalt at the interface.

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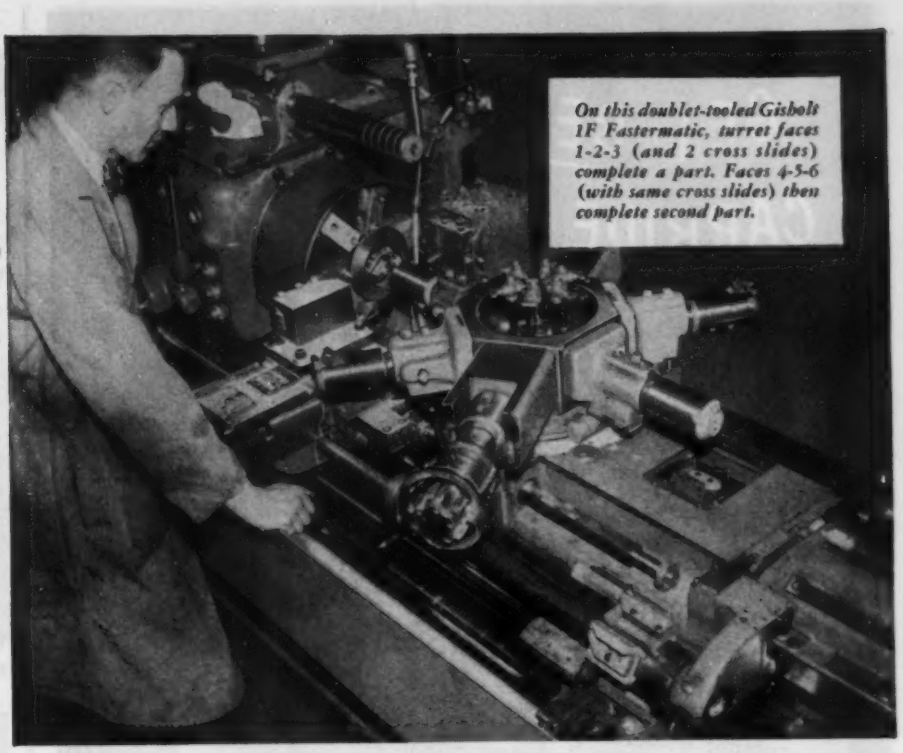
HOW DUPLICATE TOOLING... AND A FASTERMATIC...



On this doublet-tooled Gisholt 1F Fastermatic, turret faces 1-2-3 (and 2 cross slides) complete a part. Faces 4-5-6 (with same cross slides) then complete second part.

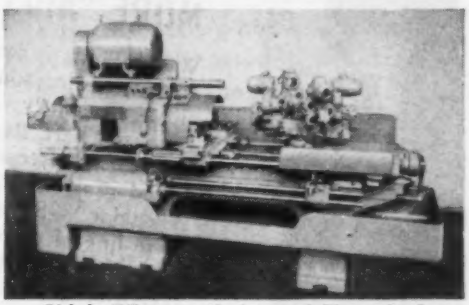
doubled production!

The time *and unit cost* for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that *two* parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.

Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turret rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.D.



Gisholt 1F Fastermatic Automatic Turret Lathe

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

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Wendt-Sonis offers only the best from which to choose. Select the right tool for the job from the W-S family of more than 1,000 standard carbide cutting tools. W-S offers extra economies, faster tool delivery when you rely on carbide grade equivalents.

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Wendt-Sonis is known throughout industry as an outstanding source for important production aids. Currently available on request: Chip Breaker Chart, Reaming Instruction Chart, Carbide Grade Recommendation Chart, Feed and Speed Calculator, Decimal Equivalent Chart. Ask your W-S distributor to show you the complete line of carbide cutting tools from 72-page W-S catalog, or write WENDT-SONIS COMPANY, HANNIBAL, MISSOURI for complimentary copy.

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DRILLS • END MILLS • BURS • TOOL BITS • SOLID CARBIDE TOOLS • REAMERS
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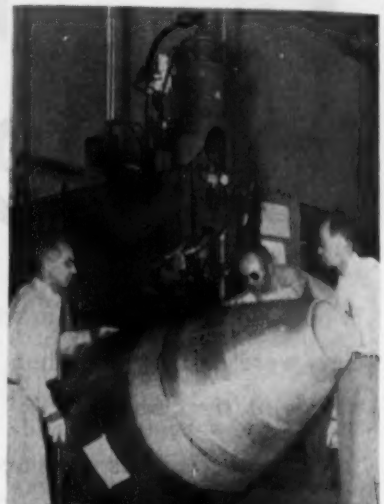
—Technical Briefs—

Spotwelding:

Large structures, heavy gage metals stitched together.

More and more spotwelding is being used to "stitch" together exceptionally large structures and heavy-gauge metals. New machines to do this job, largest of their type in the country, have been built to specifications of the Ryan Aeronautical Co.

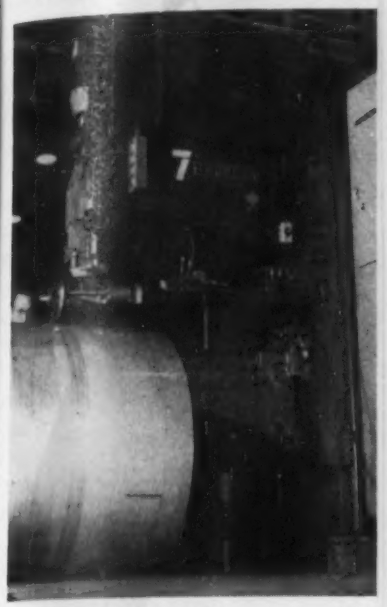
Only recently has spotwelding overcome problems which handicapped its extended use. Inaccurate timing and insufficient current capacities and pressures limited its application to small, secondary components and to thin-gage materials.



FUEL TANK NOSE section is easily handled in big, fast spotwelding machine.

Efficiency Boosted—Higher efficiency is possible in spotwelding. Ryan secures spotwelded joints in stainless steels that are 100 pct efficient compared with an average of 60 pct efficiency for riveted joints.

Jet engine combustion chambers and transition liners of Inconel and cone and tail-pipe assemblies of stainless steel are also spotwelded. The stainless steels and nickel base alloys are well fitted

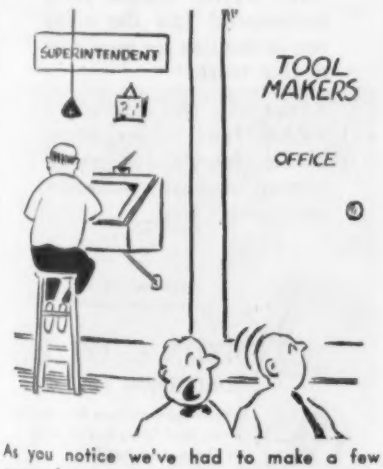


THOMSON SEAM welder easily handles large round sections at Ryan's plant.

for spotweld design because their high electrical resistance makes short heating time possible.

Slope Control—Some special effects are possible with electronic controls. These include: Slope control of welding current for higher heat; controlled diminution of current amplitude after welding to obtain retarded cooling of the metal and prevent shrinkage cracks.

Pre-heating control which allows electrodes to seat better and also permits the spotwelding of these heavy materials with lower currents. Post-heating technique is used to temper spotwelds in heat-treatable steels without using a furnace.



As you notice we've had to make a few concessions.

Turn to Page 156

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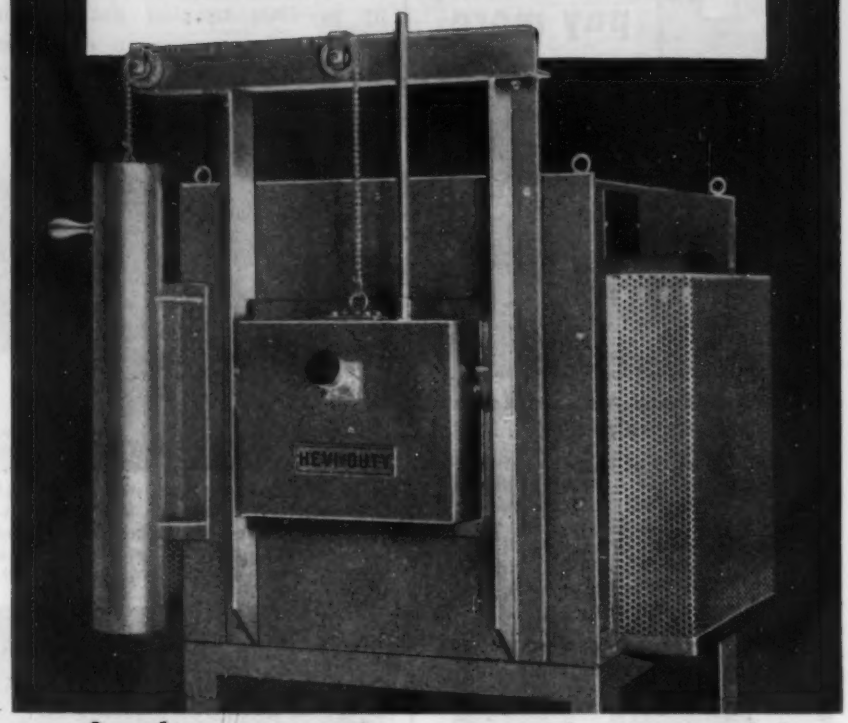
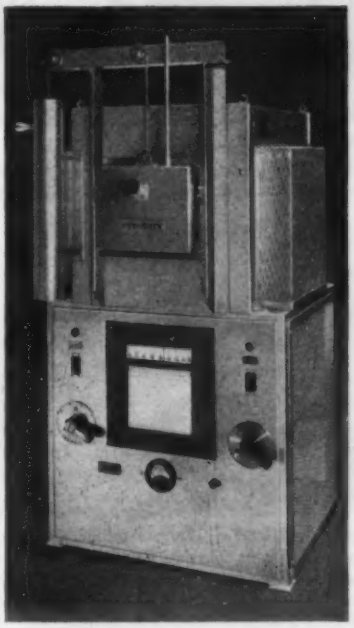
with a HEVI DUTY
G-8156 HIGH TEMPERATURE
BOX FURNACE



. . . for heat-treating operations requiring elevated temperatures for *RESEARCH CERAMICS* and *High Speed STEELS*



Silicon Carbide (* Globar) heating elements located above and below a sealed muffle assure even heat distribution throughout the work chamber. Connections for using a protective atmosphere are provided.

The furnace is available in several sizes with or without the control base as shown in the insert. Transformers, pyrometer and circuit breakers can be supplied as required.

Write for bulletin HD-741

* trademark, Carborundum Co.

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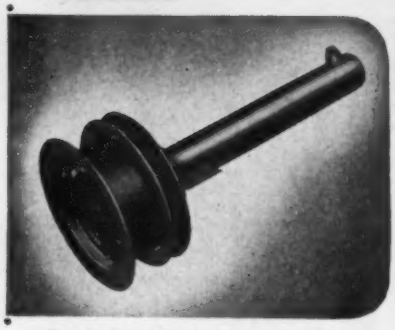
2 ways to make crane operations pay more



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Steel tagline holds magnet steady and absorbs the load . . . protective slack is maintained in expensive magnet cable to avoid jerking, pulling loose at the terminals or snagging.

Standard with major crane manufacturers, made in five sizes for your present equipment.

Rud-O-Matic Tagline

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I'd like more information on ☐ Rud-O-Matic Taglines, ☐ Rud-O-Matic Magnet Reel-Tagline Combinations. Send literature and complete details.

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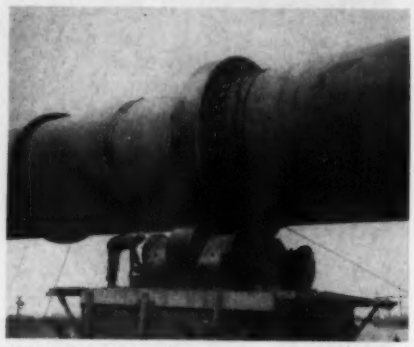
—Technical Briefs—

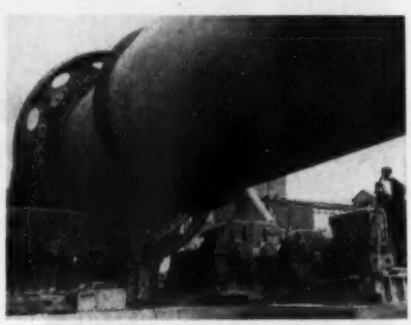
Rotary Kilns:

Big kilns at Ohio plant will handle 2000 tons of dolomite daily.

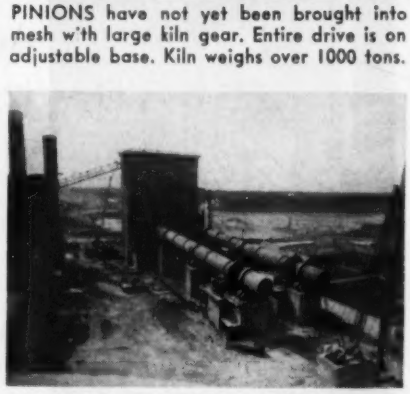
Two rotary kilns, 390 ft long and 11 ft in diam, said to be the largest in the industry, will handle up to 2000 tons of dead-burned dolomite daily when in operation at the Maple Grove, Ohio, plant of Basic Refractories, Inc.



KILN TIRE on roller. Two steel sections of rotary kiln are joined with clips. After assembly is aligned, joints are welded and clips removed. Kiln motion, incline move dolomite from charge to discharge end.



PINIONS have not yet been brought into mesh with large kiln gear. Entire drive is on adjustable base. Kiln weighs over 1000 tons.



OVERALL VIEW of kiln assembly at Maple Grove plant of Basic Refractories, Inc., shows layout of two new rotary kilns, said to be the largest in the industry, will handle up to 2000 tons of dolomite daily.

Completely assembled the kilns will be on an incline (18 ft higher at the feed end). In normal operation, the kilns will turn at about ½ to 1½ revolutions per

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1081A

minute. The incline and rotary motion will impart travel to the dolomite mixture.

Heated to 3000°F — Powdered coal will be fired into the kiln from the discharge end. As the mixture moves toward discharge, it will be progressively heated, until near discharge, it reaches temperatures in excess of 3000°F.

The kiln, weighing 1050 tons including brick work, is turned by a dual drive consisting of two Allis-Chalmers dc motors of 100 to 125 hp driving a speed reducer through a V-belt.

Test Conditioning Units

Representatives from three major shipyards and the U. S. Maritime Administration recently observed formal acceptance tests with the new Kathabar marine-type humidity conditioning units at the Surface Combustion Corp., laboratories in Toledo.

Tests were supervised by an engineer from Battelle Memorial Institute, Columbus, Ohio. Specifications called for dehumidification of 7000 cu ft of air per minute from 140 grains of moisture per pound of dry air to 50 grains per pound, utilizing 88°F sea water for cooling the absorbent solution.

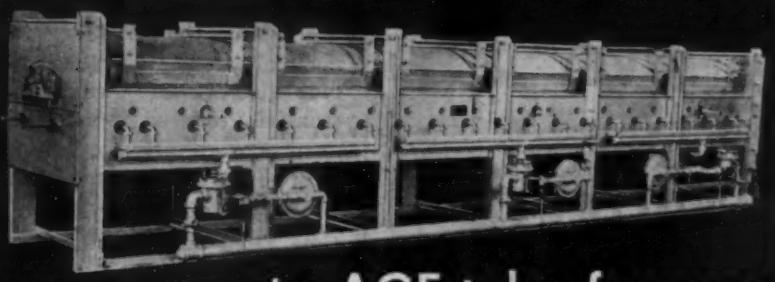
More Steel From Openhearths

How to get more steel per open-hearth furnace is one of the subjects reviewed in the April issue of Technical Reports Newsletter. The newsletter is available free from the U. S. Dept. of Commerce field offices.

X-RAY FLUORESCENCE analysis is explained by engineer William Zingaro (adjusting glasses) at the meeting of the Philips Diffraction School sponsored by North American Philips Co., Inc.

Turn to Page 158

No more "HOT" spots



the AGF tube furnace

model NO. 72

The Reduction of Oxides is very efficiently accomplished in this furnace because of the large number of small burners scientifically positioned to direct a uniform heat along the entire operating length of each tube. This prevents "hot spots" and provides longer tube life.

Other advantages are—

- RIGID ATMOSPHERE CONTROLS
- UNIFORM HEATING OF TUBES
- REMOVABLE ROOF TO FACILITATE ACCESS TO INTERIOR CHAMBER

Specifications—

Chamber length—20 ft., Capacity 6 tubes 2½" I.D.
Entrance is reg. 2" high, max. 4" x 20" wide.
Max. air—85 C.F.M. at 16 oz.
Max. Cons.—(525 B.T.U. Gas)—1000 C.F.H.

For the manufacture of metallic tungsten, molybdenum, etc., long tube furnaces are generally used having one or more tubes through which "boats" are pushed, containing the material to be reduced. Similar types of AGF furnaces are used for the hardening and annealing of steel or brass wire and wire strip.

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Write for details and descriptions of AGF TUBE FURNACES.

ALLOY TROUBLE?

If you have missed the special Iron Age series of five articles on boron steel which appeared last July and August you may want to order a reprint.

A 30-page reprint booklet covers the following:

1. Boron steel alternates for standard grades. 2. Advantages and limitations of boron steels. 3. Hardenability charts. 4. Case studies of boron steel use in plants making gears . . . pinions . . . springs . . . bolts . . . axles.

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—Technical Briefs—

Wire Drawing Dies:

English find replacement of dies in batches cuts lost time loss.

Working time lost by replacement of single worn tungsten carbide wire drawing dies can be substantially reduced by batch replacement of worn dies, the British Iron & Steel Research Assn. has found.

Studies by BISRA indicate down time from this cause ranges between 5 and 10 pct of machine working time. In one plant loss of output ranged between 1000 and 2000 tons a year.

Inspection—Studies of wire drawing tungsten carbide dies indicate the need for a more reliable inspection method to determine exact contour and size of the die hole.

To meet this need the Assn. has developed a bore profilometer, a precision instrument suitable for development work on die shapes for new production lines.

Develop New Cutting Fluid

A water soluble synthetic cutting fluid promises faster cutting and longer tool life. The clear fluid permits greater visibility of the part during the operation.

Best results have been obtained by mixing the fluid, Ucon Cutting Fluid H-660, developed by Union Carbide & Carbon Corp., with two to two and a half parts water. In grinding operations the fluid is mixed one part to 25 to 33 parts water.

Study Heat Resistant Alloys

Conservation of nickel and chromium in heat resistant castings is the objective of a research project recently announced by the Alloy Casting Institute, of Mineola, N. Y.

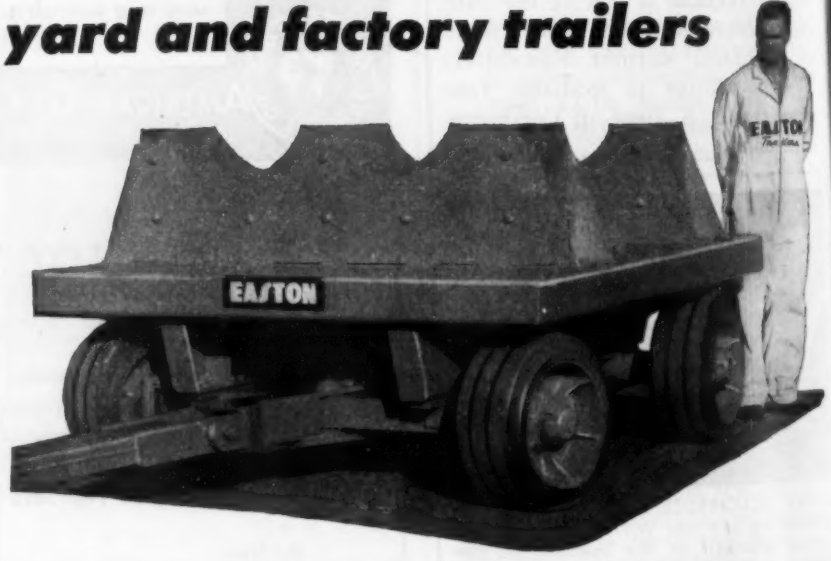
Conducted at Battelle Memorial Institute, research has been concentrated on developing a heat resistant material of lower alloy content than the high nickel alloys used in 900-1400°F service.

Turn to Page 160

A-1029

EASTON

heavy-duty dependability in yard and factory trailers



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Each car is put into first class operating condition in Chicago Freight Car's own shop to assure long, trouble-free service.

GENERAL SPECIFICATIONS

Capacity, nominal
100,000 lbs.

Light weight, approx.
44,000 lbs. (aver.)

Load Limit
125,000 lbs. (aver.)

Inside length
40 ft. 0 in.

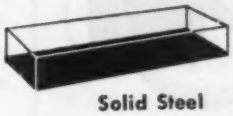
Inside width
9 ft. 7 in.

Inside height
4 ft. 2 in.

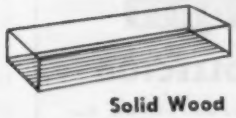
Cubic capacity
1552

Construction details available upon request.

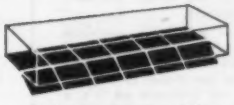
Three Types of Bottoms Available



Solid Steel



Solid Wood



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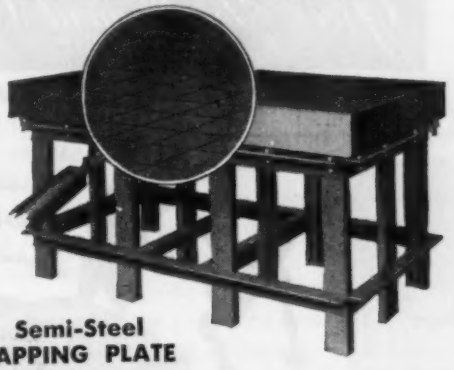
• CHECKING
• LAPPING
• ASSEMBLY
• WELDING

Available either precision ground or planer finished, Challenge Layout Surface Plates offer a perfectly smooth, square surface for layout, inspection or assembly line operations. Sizes range from 12" x 18" to 54" x 144". All are built of special analysis semi-steel. The all-steel stand is arc-welded to furnish the rigidity of a one-piece unit. Special leveling screws enable the user to level the plate quickly and to lock it securely.



Semi-Steel LAPPING PLATE

For Accurate Lapping of Delicate Joints. Assures perfect fit when lapping metal-to-metal joints on which no sealer is used. Ideally suited for use on parts which must be lapped perfectly to avoid oil leaks. Plates have 1/16" grooves 1/2" apart.

CHALLENGE semi-steel WELDING TABLE

The Challenge Welding Table illustrated above provides a true, rigid surface with Tee-Slots to facilitate assembling, locating and welding. It is built of fine grain special analysis semi-steel in three standard sizes: 30 x 60", 48 x 96", and 54 x 144"; other sizes to order. 682

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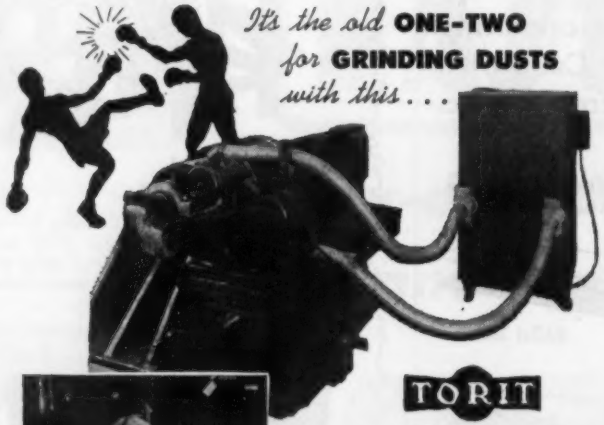
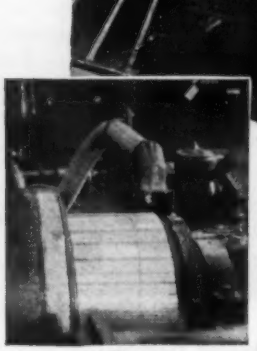


It's the old **ONE-TWO** *for* **GRINDING DUSTS** *with this . . .*

TORIT

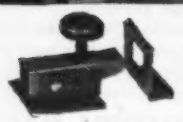
DUST COLLECTOR



Poke him off balance with your left, then let him have it with your right. That's good boxing and, in the setup pictured here, good dust collecting.

On this commutator grinder a problem of turbulence and heavy dusts was solved with a Torit No. 84 Dust Collector and dual hooding. Here the lower hood sort of pokes the dust off balance so it's a sucker for the one on top . . . and dust no longer prevents accurate turning of the commutator.

Torit has been solving dust problems like this for forty years. Our experience and know how are at your command . . . so bring *your* dust problems to—



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P.S. Also ask for the latest Torit catalog showing the complete Torit line of dust collecting equipment.

—Technical Briefs—

Corrosion:

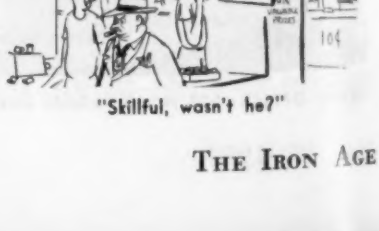
Atomic energy corrosion requirements described at meeting.

Stringent requirements for corrosion rates applied to metals used in atomic energy plants were described by Dr. J. E. Draley of the Argonne National Laboratory at recent corrosion conference in New York. The meeting was sponsored by the National Assn. of Corrosion Engineers.

Laboratory investigation of the corrosion resistance of aluminum 2S showed low corrosion rates in aqueous electrolytes in pH range 4.5 to 7.0 temperatures less than 100°C, and water velocities up to 20 feet per second. However, chloride ion in concentration of 2 ppm in this pH range caused pitting. At pH values less than 4.5 and more than 7 the corrosion rate increased rapidly and increased water velocity caused increased corrosion.

Corrosion Increases—As the temperature of the aqueous solution was increased, there was a sharp increase in the corrosion rate of aluminum in the region between 100°C and 150°C. Intergranular attack was observed at 275°C in distilled water whose pH had risen to 8 or higher. The pH value at which aluminum corrosion was minimum varied inversely with the temperature. For example, at 315°C the minimum corrosion rate occurred in a solution with pH of approximately 2.

Among other corrosion problems peculiar to atomic energy operations, mentioned by Dr. Draley, are the handling of corrosive reagents used in the chemical separation of plutonium and uranium, and the difficulty of disposing of radioactive waste products.



"Skillful, wasn't he?"

Industry Bounces Back From Second Knockdown

Operations this week scheduled at 100.5 pct of capacity . . . Despite loss of 2.5 million tons there's no panic for steel . . . Industry recommendations show the way for decontrol.

The steel industry is recuperating rapidly from the two production knockdowns it has received from labor. Operations this week are scheduled at 100.5 pct of rated capacity, up 18 points from last week's revised rate. The second shutdown caused some unnecessary damage because of its suddenness, but not nearly as much as was at first feared.

Steel consumers have not become panicky, despite the loss of 2.5 million tons of production caused by the two shutdowns. During the past several weeks there has been some tightening of the market, but nothing like what many had expected.

Slight Pressure—Even the certainty of higher steel prices isn't causing buyers to exert great pressure for delivery. This seems to bear out the findings of a recent IRON AGE survey which showed steel inventories to range generally between 30 and 60 days. Steel inventory may be better than money in the bank, but a good many consumers evidently don't have the ready cash to invest in it. A good many more would find themselves in violation of inventory limits if they increased their buying. And, of course, the biggest reason of all is the need for CMP tickets.

Generally, the same products remain in tightest supply—hot-rolled and cold-finished carbon bars in larger sizes, heavy plates and structurals, and oil country items. And most of the same products are on the easier list—cold-rolled strip, silicon sheets, mechanical tubing, and wire products.

Hot and Cold — An exception worth noting is cold-rolled sheets. Not long ago they threatened to become a drug on the market, but demand has recently stiffened noticeably. Auto makers have become more aggressive in their buying than they've been for a long while. But appliance cutbacks may again take the steam out of this market.

Warehouses are building up inventory. However, they would still like to get more bars (both hot-rolled and cold-finished) and heavy plates. On other items, such as sheets (particularly those not prime quality), they are backing away from the market. They are becoming more particular over quality and size of slow-moving items they will accept.

Decontrol Blueprint — The decontrol recommendations of a steel industry task force may become the blueprint of the return to a free market—if the wage-price dispute can be settled without more serious loss of production. The recommendations consist of (1) a basic plan for lifting all controls and (2) interim steps for putting it into effect.

Under the plan, the fourth quarter would be a trial period during which nonmilitary consumers would be removed from CMP. But certain controls would be retained as a "safety valve." If no serious disruptions showed up during the quarter, all controls would be removed, effective Jan. 1, 1953. Military and atomic energy orders would retain first call on mill schedules.

Big Decision—Within the next 3 weeks the Supreme Court is expected to announce a decision in the steel seizure case that might set a precedent in law. The court has an adjournment date scheduled for June 3. Athough it could delay a ruling until next fall, it is not expected to do so.

In reaching a decision, these four basic choices are available to the court:

(1) The court may announce a far-reaching definition on the "inherent powers"—or lack of them—that are delegated to the President.

(2) The court may rule on one of the narrow issues involved in the case, such as Mr. Truman's authority to delegate operation of the mills to Secretary of Commerce Charles Sawyer.

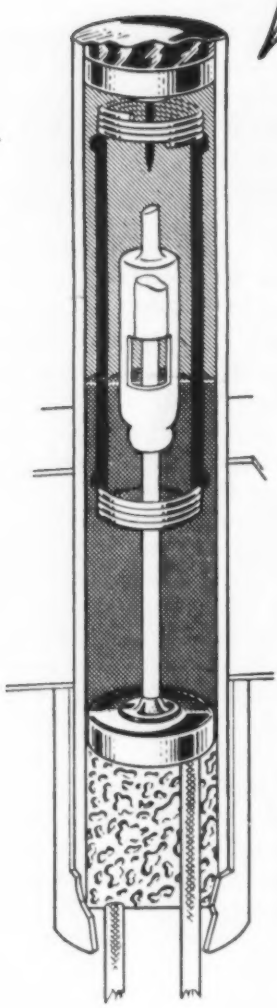
(3) The case may be returned to the Circuit Court of Appeals for decision.

(4) The court may investigate the extent of emergency which provoked President Truman's seizure order—a point which some sources believe was not fully explored in previous hearings. If the Court follows this course, it might find that the President was too hasty—that he ordered seizure of the industry before he explored other avenues of action available to him.

Possible Action—Should the Supreme Court block seizure, Mr. Truman still has these courses open: (1) He may set up a board of prominent citizens to hold new hearings on the dispute. (2) He may toss the whole problem to Congress with a request for legislation covering questions of seizure and price and wage control standards. (3) He may invoke the Taft-Hartley Act which Congress has provided, and refused to alter along lines recommended by him.

Mercury Relay Stainless Tubing Specifications:

Type 304: Super Finish on ID
OD tolerance ±.003″
ID tolerance +.000″
−.006″



Super finish needed on the inside, to permit ID broaching without so much as a scratch or a pinhole! Tolerances have to be held just right on tube after tube after tube!

Right there you have this manufacturer's reason for specifying *Carpenter* Stainless Tubing over a long period of years.

When you have a Stainless Tubing problem that requires something extra in mill experience and product quality, it will pay you to get in touch with Carpenter. Let us work with your engineers in the development of *your* future products.

Slide Chart on Bending Stainless Tubing gives recommended bending radii and coil diameters for various sizes and gauges. To get good results on bending jobs and avoid waste of critical material, write for your copy.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"

Carpenter
STAINLESS TUBING

—guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW

Market Briefs

Alloy Forgings—Production officials have estimated that output of alloy steel forgings will have to be increased 25 pct to meet current demands and cut into the growing backlog. Reports to National Production Authority show that the order backlog now amounts to 720,000 tons, about 200,000 tons of which have been added over the past 2 months, officials say. Production of die blocks for the heavy presses needed by the aluminum forging industry alone will require more than 67,000 tons over the next 18 months, they add.

New Plans—The Detroit Steel Corp. has requested Reconstruction Finance Corp. aid in financing and expansion program at the Portsmouth, Ohio, Works. Construction work is already about 35 pct completed with work started on a blast furnace, hot strip mill, a cold rolled strip mill and blooming mill, and four openhearth furnaces. The requested loan, $45 million, is expected to replace originally announced plans for a $25 million first mortgage bond issue and issuance of $15 million in convertible preferred stock.

War Tooling—Defense orders account for 50 to 90 pct of the tool and die industry's new business in most areas, according to Randolph H. Cope, president, National Tool & Die Manufacturers Assn., and vice-president, Bunnell Machine & Tool Co., Cleveland. In Los Angeles, where 90 pct of new orders are for armament, the industries most active in buying new tooling are aircraft, guided missiles, radar, and ordnance. The New York area shows large orders from the aircraft and electronics industries.

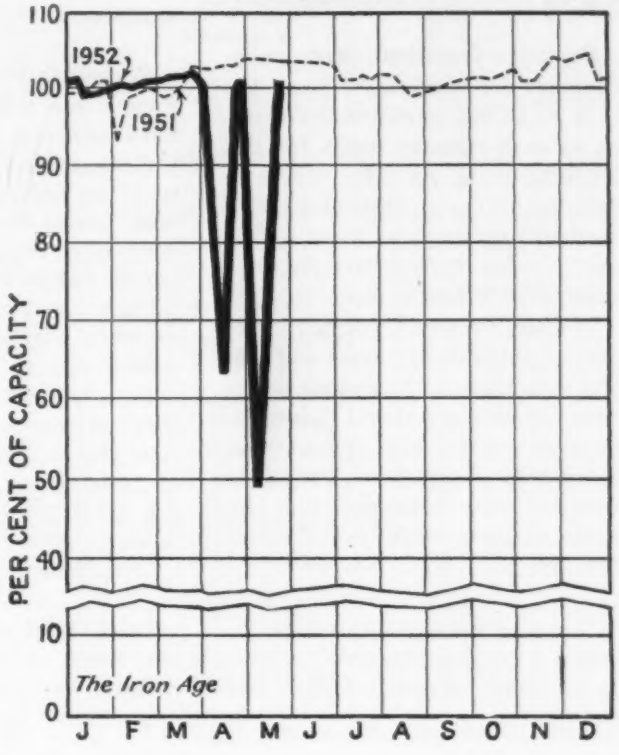
Expansion—McLouth Steel Corp., Detroit, plans to jump out of the strictly electric steel mill classification if a $50 million loan application is approved by the Reconstruction Finance Corp. Loan was asked by the Trenton Corp., a McLouth subsidiary. It is intended to finance a blast furnace, coke ovens, ore docks and working capital.

Japanese Plastics—A vinyl plastic plant, engineered and supervised by B. F. Goodrich Chemical Co., has begun operations at Kambara, Japan. The plant is owned and operated by Japanese Geon Co., Ltd., of which BFG Chemical is a principal stockholder. It will have a capacity of 6 million lb a year and will increase vinyl plastic production in Japan by 50 pct. Production wil be used in the manufacture of wiring insulation, raincoats, garden hose and similar products.

Mill Bookings—Just how much the work stoppages will affect steel order carryovers into the third quarter has not yet been determined by the mills. One leading producer estimates that the strikes will have cost 8 to 10 days' production. However, prior to the work stoppages it was estimated that third quarter carryovers on such hard-to-get items as hot rolled and cold finished bars would be a month or more. The strike will most certainly increase these estimates.

Cobalt Needs—Domestic needs for cobalt will reach a new high of about 21,000,000 lb annually by 1955, it is estimated by National Production Authority. This would mean that the amount available from both domestic and foreign sources will have to be increased by 11 million lb over the 1950 supplies.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
May 4	84.0*	83.5*	84.0*	86.0*	75.0*	74.0	86.0*	78.0	93.0*	72.0	89.0	78.0	70.0	82.5*
May 11	102.0	103.5	99.0	100.0	103.5	104.0	100.0	103.0	99.0	102.0	94.5	83.5	85.0	100.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

No Agreement Yet on Chile Copper

Both sides await offer from the other . . . Discussions going to highest levels . . . Situation critical . . . President Videla grants increases ending 2-week strike — *By R. L. Hatschek.*

The Chile copper strike is over. But at press time the overall situation regarding Chilean copper was completely muddled.

Workers were scheduled to report back to the Anaconda Copper Mining Co. properties on Tuesday and they were reported to have pledged to work Sundays and holidays until the lost time is made up. The 2-week-plus strike ended when President Gonzalez Videla, acting as mediator, granted approximately a 27¢-per-day wage increase and a $2.34 boost in family benefits.

Price the Question—Meanwhile, contract negotiations between the U. S. and Chile continue deadlocked as each country waits for the other to make an offer. Chile is holding out for a substantial price increase—perhaps as much as 35¢ per lb with 33.5¢ generally considered to be well acceptable.

Defense Production Administration is unwilling to make any official comment on the copper situation. Officials are afraid that to do so might affect the negotiations being held at high level. President Truman has indicated that he would confer with the Chilean president.

"Very Serious"—Manly Fleischmann, DPA chief, regards the matter as "very serious" while some feel privately that it is even more serious than the steel picture.

Another reason for official silence is that loose talk might stir up other countries, notably Russia and her satellites, into a buying spree which would act to prevent non-buying by the U. S. from depressing the world price, now about 38¢ per lb. Open economic warfare on metals with Russia at this time would be disastrous in the eyes of DPA. Against this is the possibility that Chile might not want too much non-dollar business.

Feelers Out—It is reported that some western European countries have already made offers for Chilean copper with prices rumored at up to 40¢ per lb. Just how much metal this market could absorb at a price that high is unknown but it is felt that if total Chilean production were dumped on world markets the price would soon tumble to under 30¢.

DPA wants to get a new agreement at something less than 10¢ over the current domestic ceiling of 24.5¢. Aside from anything Office of Price Stabilization would agree to, DPA is definitely opposed to government subsidy.

Lead Quiet — Despite the first two recent reductions in the price of lead, the market remained dull with buyers showing very little enthusiasm for the 17¢ price.

That price didn't hold very long. Yet another 2¢ cut went into effect on Monday, bringing the price to 15¢ per lb at New York. Buyers had been anticipating such a price cut. They are now coming into the market more heavily.

Zinc Buyers Careful—In view of what has been happening to the price of lead, buyers of zinc have also been very careful and the majority of contracts today are on an average monthly price basis. Demand for Prime Western remains firm while few purchasing men are pressing for the higher grades. It had been generally anticipated that zinc prices would move downward this year and the present situation may accelerate this action.

Joseph Fowler, to be Mr. Fleischmann's successor as DPA boss, says that relaxation of zinc controls is in the works and will be announced as soon as the operating divisions can get them polished up.

Output High—Total slab zinc smelter output for April was 83,011 tons, off 2000 tons from the previous month but at a daily average of 2767 tons. This average is only 8 tons lower than the all-time record set in March 1945. Production for the first 4 months of the year totals 328,540 tons.

Shipments approximated the March total with 85,592 tons, according to the American Zinc Institute. This brings stocks at the end of April to 23,423 tons, lowest so far this year but still above average for the last 2 years.

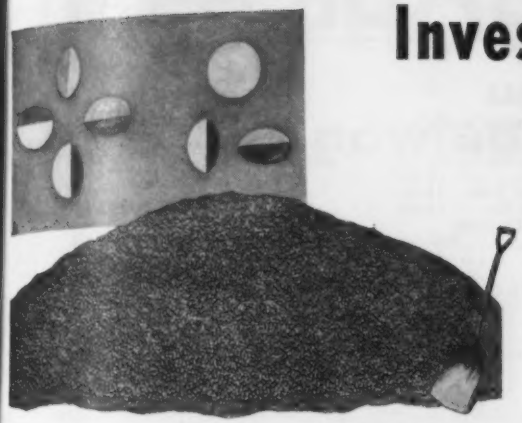
Aluminum High—March output of primary aluminum hit 77,069 tons, bringing the first quarter total to 226,334 tons. Reynolds Metals Co. is scheduled to give production a boost starting today when the first metal is poured at the company's new Corpus Christi reduction plant.

NONFERROUS METAL PRICES

	May 7	May 8	May 9	May 10	May 12	May 13
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	16.80	16.80	16.80	16.80	14.80	14.80

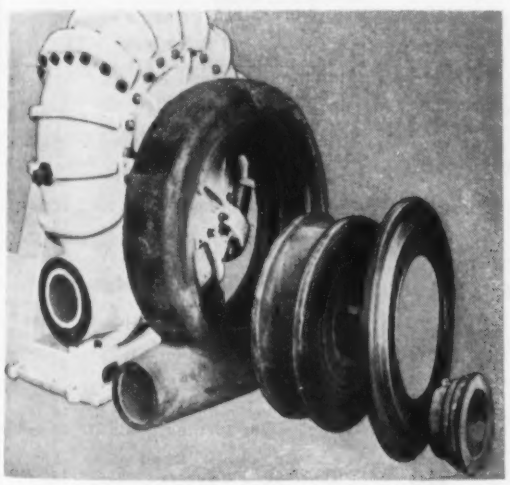
Note: Quotations are going prices.

Investigate NI-HARD for your ABRASION PROBLEMS



SEE FOR YOURSELF why NI-HARD cuts grinding costs. Unlike other cast irons, NI-HARD is composed of a multitude of hard carbides firmly embedded in a matrix which is as hard as fully hardened steel. Ni-Hard balls are produced in sizes from ⅝" to 1¼". Balls at left above are sectioned to show soundness.

THESE BALL MILL LINERS of chilled NI-HARD replace rolled steel liners for milling ores. The user previously used all types of liner materials, including manganese steel, chilled iron, etc., before standardizing on NI-HARD.



SOLIDS-HANDLING PUMP PARTS, produced to take full advantage of NI-HARD, include impellers, shell liners, suction side liners, engine side liners, throat and seal rings.

NI-HARD is produced by authorized foundries from coast to coast

Ni-Hard® . . . an abrasion-resisting nickel iron . . . has proved the answer to hundreds of problems involving severe abrasive wear. During the past 20 years it has set notable records for length of service, down-time saving and *ultimate economy* where wear-resistance is the primary requirement. A few typical Ni-Hard applications are illustrated.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of NI-HARD for many end uses in defense and defense supporting industries. There are authorized foundries, from coast to coast, equipped to produce NI-HARD castings in all common forms and shapes.

SOURCES OF SUPPLY FOR NI-HARD CASTINGS

EASTERN SECTION...

Plattsburg
Foundry & Machine Co.
18 White St.
Plattsburg, N. Y.

Engineered Castings Div.
American Brake Shoe Co.
10 Mount Read Boulevard
Rochester 11, N. Y.

Brake Shoe
& Castings Div.
American Brake Shoe Co.
230 Park Ave.
New York 17, N. Y.

American
Abrasive Metals Co.
460 Coit St.
Irvington 11, New Jersey

Palmyra Fdry. Co., Inc.
Arch St. Station
Palmyra, New Jersey

U.S. Pipe & Fdry. Co.
Burlington, New Jersey

Hardinge Mfg. Co.
240 Arch Street
York, Pa.

Link-Belt Co., Olney Fdry.
180 W. Duncannon Ave.
Philadelphia 20, Pa.

New Castle Fdry. Co.
Mahoning Ave. &
Hobart St.
New Castle, Pa.

The Pennebacker Co.
Emmaus, Pa.

Sprout,
Waldron & Co., Inc.
Sherman St.
Muncy, Pa.

Treadwell Engrg. Co.
Lenox & 25th Street
Easton, Pa.

Weatherly
Fdry. & Mfg. Co.
Commerce St.
Weatherly, Pa.

Georgia Iron Works Co.
605 12th St.
Augusta, Ga.

Pekor Iron Works, Inc.
P. O. Box 909
Columbus, Ga.

Thomas Foundries, Inc.
3800 10th Ave. No.
Birmingham 1, Ala.

CENTRAL SECTION...

The Brom
Mach. & Fdry. Co.
3565 W. 6th St.
Winona, Minn.

Staver Foundry Co.
Box 74
Virginia, Minn.

Bassett Foundry Co.
Adrian, Mich.

Calumet & Hecla Cons.
Copper Co.
Calumet, Mich.

Engineering Castings, Inc.
405 S. Linden St.
Marshall, Mich.

The Babcock & Wilcox Co.
85 Liberty St.
New York 6, N. Y.
(Plant: Barberton, Ohio)

Brake Shoe
& Castings Div.
American Brake Shoe Co.
109 N. Wabash Ave.
Chicago 4, Ill.
(Plant: Melrose Park, Ill.)

Frank Foundries Corp.
2020 3rd Ave.
Moline, Ill.

Griffin Wheel Co.
445 N. Sacramento Blvd.
Chicago 12, Ill.

Wells Manufacturing Co.
7800 N. Austin Avenue
Skokie, Ill.

Eagle Iron Works
129 Holcomb St.
Des Moines, Ia.

Helmick Fdry.-Mach. Co.
8th St. & Belt Line
Fairmont, W. Va.

Carondelet Foundry Co.
2101
S. Kingshighway Blvd.
St. Louis 10, Mo.

Keller Foundry Co.
1010 E. Jackson Ave.
Knoxville, Tenn.

Arkansas Foundry Co.
1501 East Sixth St.
Little Rock, Ark.

WESTERN SECTION...

Eagle Foundry Co.
75 Horton St.
Seattle 4, Wash.

Union Iron Works
Box 2135
Spokane 2, Wash.

Caird Engineering Works
Helena St. &
Montana Ave.
Helena, Montana

Pacific Ball Mfg. Co.
P. O. 106
Southgate, Calif.

Pacific Foundry Co., Ltd.
3100 19th St.
San Francisco, Calif.

Stanley Foundries
6009 Santa Fe Ave.
Huntington Park, Calif.

Capitol Foundry Co.
Phoenix, Arizona

Darbyshire Steel Co., Inc.
P. O. Box 352
El Paso, Tex.

Texaloy Foundry Co.
1407 Hoefgen
San Antonio 3, Tex.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5 to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. **Coiled Sheet:** 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ⅛ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅞ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepair on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.13	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	44.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium dollars per troy oz.	$200
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$200 to $204
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	87.00
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.33
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33¾
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz., f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19⅛	17⅞
Red brass	20½	19⅜
Comm. bronze	20½	19⅜
Mang. bronze	18½	18⅛
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17⅝
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14⅝
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½
Aluminum	
Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8
Zinc	
New Zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7
Nickel and Monel	
Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	11 —11¼
Battery plates (dry)	6¼— 7
Batteries, acid free	5
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	100 —110
No. 1 pewter	80
No. 1 auto babbitt	60
Mixed common babbitt	13 —13½
Solder joints	20 —21
Siphon tops	60
Small foundry type	18½
Monotype	15 —15½
Lino. and stereotype	14 —14½
Electrotype	12 —12½
Hand picked type shells	10 —11
Lino. and stereo. dross	6 — 6½
Electro. dross	3 — 4

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Is the Scrap Market Really Weak?

Trade discusses whether sales below ceilings in openhearth grades are due soon . . . Many feel talk is premature . . . Scrap is not yet that abundant . . . Summer will tell the tale.

A mild undercurrent of speculation among scrap buyers and sellers swirls around the subject of sagging prices—whether or not steelmaking grades will submerge below Office of Price Stabilization ceilings.

Responsible scrap men say that some of the alarmist rumors of price collapse tomorrow are premature. But they do admit that the scrap situation has changed enough in the past few weeks for anything to happen. Today the scrap market holds a lot of strength. Scrap movement of openhearth grades continues at a strong and steady pace and the material is not yet in sheer abundance.

Before any price drop in the steelmaking grades is possible warmer weather must improve supply by another few notches. Some scrap consumers are believed willing to take advantage of freer supply to lower scrap prices but there are many purchasing men who do not want to endanger supply by forcing a price drop.

As warm weather fattens scrap supply, mills can be expected to be more insistent in warning their brokers not to commit themselves to long-term buying. Much more emphasis will be put on quality of shipments and shorter freight hauls. Some of the weaker grades (perhaps blast furnace and some bundles) may furnish the prelude for a general price drop.

The summer will tell the tale. A sleeper in the situation will be whether or not mills want to enlarge stockpiles to the huger limits previously considered safe. This can keep the market strong.

Pittsburgh—General opinion here is that the market is weakening. One consumer, at least, looks for a drop to below-ceiling prices on melting grades within the next 30 to 45 days. Two consumers were forced to order a holdup on shipments due to a traffic jam at unloading depots and the need for reducing demurrage charges. Some dealers are trying to arrange 60-day contracts as a hedge against a price drop. Mills are warning brokers against going "long" on orders.

Chicago—Scrap purchasers here report fair to good inventories generally. Sufficient scrap is arriving to permit some inventory increase. Cast orders continue small, with a few tie-in sales reported. Electric furnace supply seems good, with at least one user reporting an increase in offers of punchings. But electric furnace buyers have been moving rather slowly in accepting the offers. Bundles have been good quality, with few rejections.

Philadelphia—Cast market is ready for burial. A sale of cupola last week drops the quotation to $41 to $42 delivered but no other business was reported. At least one broker "would be surprised if a cast sale were made this week." Offerings of unstripped motors at $36 went untaken. A foundryman was told by his dealer to name his own price but he bought nothing (see p. 70). Steel grades remain tight and a new batch of allocations were issued last week.

New York—Speculation that prices of steelmaking grades may sink below ceiling indicates that some consumers may be willing to crack OPS ceilings to cut costs. Additional emphasis on quality and shorter freight runs may be the prelude. Sagging ceilings on openhearth scrap will not be possible until summer—if by then, many scrap men here feel. On the other hand scrap movement to mills is now adequate and inventories climb. Cast slipped pricewise. (See p. 174.)

Detroit—Apparently satisfied with improving inventories, buyers are becoming very strict in making scrap purchases. Dealers complain that the quality demanded approaches downgrading. Buyers admit that the quality of scrap they are receiving is better than they have seen for some time. While ceiling prices have not been broken, below-ceiling sales are seen as "not out of the question" in the foreseeable future.

Cleveland—With the exception of blast furnace and cast grades, the scrap market here is holding up fairly well. Good electric furnace material is still in strong demand. Openhearth grades are steady. Mills wanting to build up inventories can do so with not too much difficulty. Some reports of downgrading have been heard but this was attributed by others to closer conformity to specifications or attempts to feel out the market. Such items as No. 18 are said to have been shipped as No. 16. Blast furance grades are slow.

Birmingham—Heavy melting scrap continues to come into the district in good amounts. Mills are now getting allocations only on railroad grades. Dealers say scrap is coming into their yards slower than in the early part of the year because farmers have gone back to their crops.

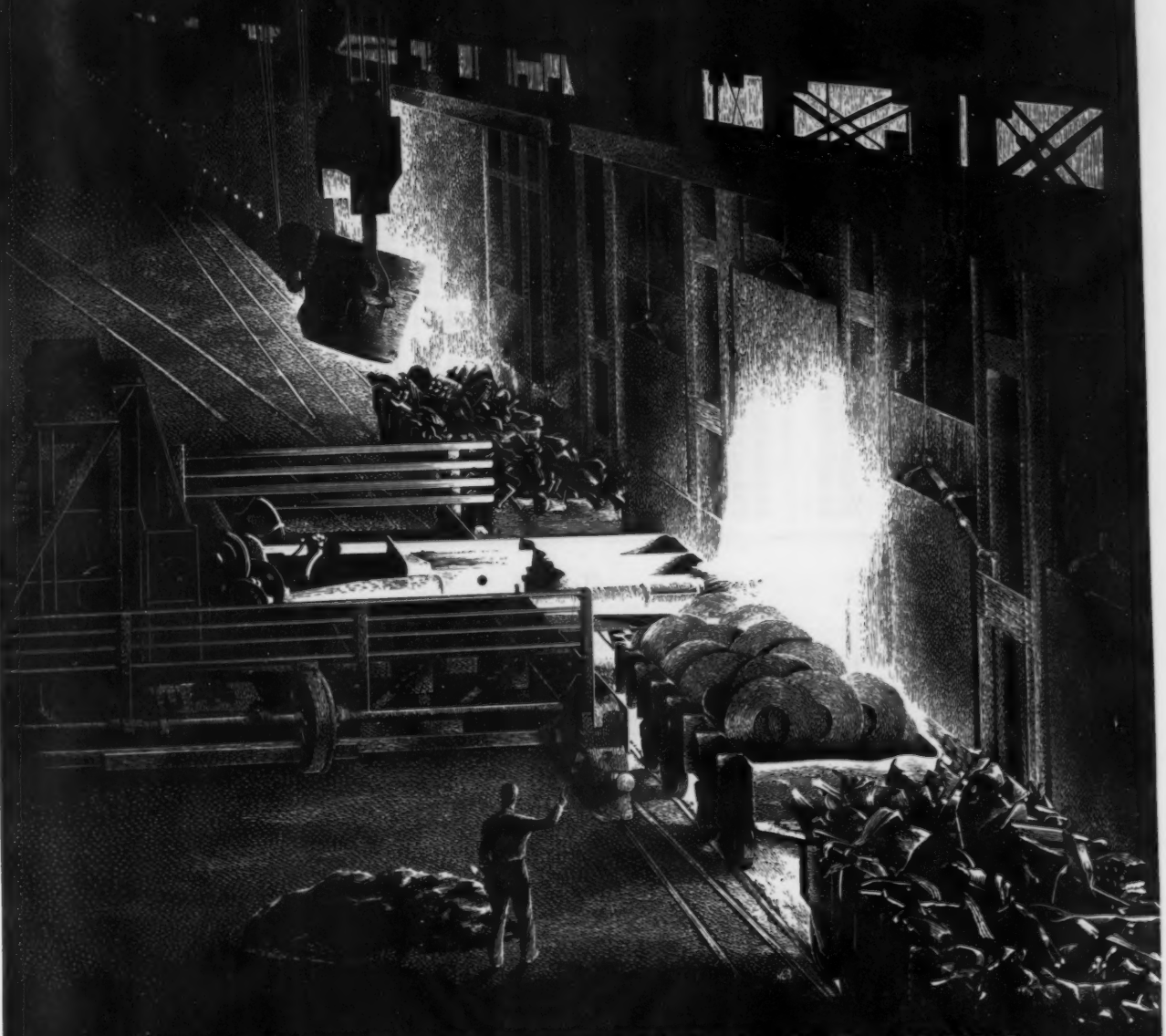
St. Louis—Uneasiness as to the steel strike situation plus a feeling that prices will go below ceilings for scrap iron have created a cautious buying attitude by the mills in this district, but there have been no cancellations. Foundry grades grow weaker. There is a report of a sale of motor blocks at $35 a gross ton delivered mill.

Cincinnati — Scrap is flowing to mills at a steady pace, inventories continue to improve. With inventories building up generally to safe levels, consumers of quality material are increasingly able to build up their stocks. Some quarters think pessimistic reports of market conditions in the area during the coming third and fourth quarters of the year are overdrawn, and that production rates at the mills will hold up fairly well.

Boston—Steel grades present a good active market, virtually unchanged from the past several weeks But cast is another story. Demand is nil.

Buffalo—Cast scrap prices plunged sharply with no takers at levels $7 under control prices. Easier tendencies also prevailed in steelmaking grades. Shipments were at a good level. Supplies were expanding.

for the purchase or sale of **scrap**



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Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99 .75 .53 .75 .51 .75	.75 .51 .51 .75 .70	.75 .53 .53 .26	1.34 .75 .50 .20 .51 .51	.20 .52 .47 .51 .51	.51	.95	.50	.75	.50 .43 .51	.33	.57	.50 .55 .53 .53 .53
Basing Points →		Pittsburgh, Johnstown, Brackenridge, Butler, Midland, Monessen, Sharon	Youngstown, Canton, Steubenville, Warren, Weirton	Cleveland, Buffalo, Cincinnati, Middletown	Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville	Sparrows Pt., Bethlehem, Ashland, Ky., Kokomo, Ind., Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham, Alabama City, Atlanta	Minnequa	Houston	Los Angeles, Pittsburg, Cal., Portland, Ore., San Francisco, Seattle
GRADES	OPS No.													
No. 1 bundles	1	$44.00	$44.00	$43.00	$42.50	$42.00	$41.00	$41.15	$40.00	$39.50	$39.00	$38.00	$37.00	$38.00
No. 1 busheling	2	44.00	44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	38.00
No. 1 heavy melting	3	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 heavy melting	4	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 bundles	5	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
Machine shop turnings	6	34.00	34.00	33.00	32.50	32.00	31.00	31.15	30.00	29.50	29.00	28.00	27.00	25.00
Mixed borings and turnings	7	36.00	36.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Shoveling turnings	8	38.00	38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Cast iron borings	10	38.00	38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
No. 1 chemical borings	26	41.00	41.00	40.00	39.50	39.00	38.00	38.15	37.00	36.50	36.00	35.00	34.00	32.00
Forge crops	11	51.50	51.50	50.50	50.00	49.50	48.50	48.65	47.50	47.00	46.50	45.50	44.50	42.50
Bar crops and plate	12	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Punchings and plate	14	48.50	48.50	48.50	45.00	44.50	43.50	43.65	42.50	42.00	41.50	40.50	39.50	37.50
Electric furnace bundles	15	46.00	46.00	46.00	45.00	44.50	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Cut struct., plate, 3 ft and less	16	47.00	47.00	46.00	45.50	45.00	44.00	44.15	43.00	42.50	42.00	41.00	40.00	38.00
Cut struct., plate, 2 ft and less	17	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Cut struct., 1 ft and less	18	50.00	50.00	49.00	48.50	48.00	47.00	47.15	46.00	45.50	45.00	44.00	43.00	41.00
Foundry steel, 2 ft and less	20	44.00	44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
Foundry steel, 1 ft and less	21	46.00	46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Heavy trimmings	24	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 1 RR heavy melting	RR 1	46.00	46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Scrap rails, random lengths	RR 14	48.00	48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Scrap rails, 3 ft and less	RR 16	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Scrap rails, 2 ft and less	RR 17	52.00	52.00	51.00	50.50	50.00	49.00	49.15	48.00	47.50	47.00	46.00	45.00	43.00
Scrap rails, 18 in. and less	RR 18	54.00	54.00	53.00	52.50	52.00	51.00	51.15	50.00	49.50	49.00	48.00	47.00	45.00
Rerolling rails	RR 15	53.00	53.00	52.00	51.50	51.00	50.00	50.15	49.00	48.50	48.00	47.00	46.00	44.00
Uncut tires	RR 20	48.00	48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Cut tires	RR 21	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Cut bolsters and side frames	RR 23	49.00	49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
RR specialties	RR 24, 25, 29	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Solid steel axles	RR 26	58.00	58.00	57.00	56.50	56.00	55.00	55.15	54.00	53.50	53.00	52.00	51.00	49.00
No. 3 steel wheels	RR 27	51.00	51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Unassorted	RR 35	40.00	40.00	39.00	38.50	38.00	37.00	37.15	36.00	35.50	35.00	34.00	33.00	31.00

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(*F.o.b. all shipping points*)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Below-Ceiling Prices

PITTSBURGH
(Delivered)

Drop broken mach'y cast	$52.50 to $53.00
Cupola cast	45.00 to 46.00
Charging box cast	47.00
Heavy breakable	45.50 to 46.00

CHICAGO
(Delivered)

Cupola cast	$44.00 to $45.00
Stove plate	36.00 to 38.00
Heavy breakable	39.00 to 40.00
Drop broken machinery	45.50 to 47.00
Unstripped motor blocks	34.00 to 36.00
Charging box cast	42.00 to 43.00
Clean auto cast	45.00 to 46.50
Malleable	52.00 to 53.00

PHILADELPHIA
(Delivered)

Cupola cast	$41.00 to $42.00
Heavy breakable	38.00 to 40.00
Clean auto cast	44.00 to 46.00
Unstripped motor blocks	35.00 to 36.00
Charging box cast	40.00 to 42.00

CLEVELAND
(Delivered)

Unstripped motor blocks	$40.00 to $41.00
Cupola cast	48.00 to 49.00
Heavy breakable	44.00 to 45.00
Drop broken machinery	51.00 to 52.00

BIRMINGHAM
(Delivered)

Cupola cast	$42.00 to $43.00
Stove plate	39.00 to 40.00
Charging box cast	39.00 to 40.00
Heavy breakable	36.00 to 37.00
Drop broken machinery	42.00 to 43.00
Unstripped motor blocks	35.00 to 36.00

ST. LOUIS
(Delivered)

Heavy breakable	$45.00
Stove plate	42.00

NEW YORK
(Brokers' buying prices)

Drop broken machinery	$36.00 to $38.00
Mixed yard cast	36.00
Charging box cast	36.00 to 38.00
Heavy breakable	36.00
Unstripped motor blocks	30.00 to 31.00

BOSTON
(Brokers' buying prices)

Cupola cast	$37.00
Stove plate	34.00
Unstripped motor blocks	30.00 to 31.00
Heavy breakable	33.00

DETROIT
(Brokers' buying prices)

Cupola cast	$46.00
Charging box	45.00
Heavy breakable	43.00
Cast iron brake shoes	39.00
Stove plate	44.00
Unstripped motor blocks	40.00
Drop broken machinery cast	50.00

CINCINNATI
(Delivered)

Unstripped motor blocks	$40.00
Stove plate	45.00
Clean auto cast	47.00

BUFFALO
(F.o.b. shipping point)

Cupola cast	$44.50 to $45.50

SAN FRANCISCO
(Delivered)

Cupola cast	$42.00
No. 2 bundles	29.00

LOS ANGELES
(Delivered)

Cupola cast	$46.00
No. 2 bundles	29.00

SEATTLE
(Delivered)

Cupola cast	$36.50
Heavy breakable	32.00
No. 2 bundles	29.00

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50¢, and New England ports, $1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$3.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate; 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel, 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(*Consumers buying prices, del'd gross ton*)

Hvy. melting steel	$36.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	33.00
Bushelings	30.00
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	32.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	50.00

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A.W. SUPER-DIAMOND Rolled Steel Floor Plate, made with an allover, engineered pattern of raised, skid-resistant diamonds, is easy to clean, easy to match, and grips without a slip.

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Special qualities in carbon, copper, or alloy analyses
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(High Strength Sheets)

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A.W. Super-Diamond Pattern

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Standard and special qualities available in desired finishes

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 13, 1952	May 6, 1952	Apr. 15, 1952	May 15, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	10.00	70.00
Wire Rod and Skelp: (cents per pound				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	May, 13, 1952	May 6, 1952	Apr. 15, 1952	May 15, 1951
Foundry, del'd Phila.	$58.19	$58.19	$57.97	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.09	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	42.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos., Young'n	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	45.50‡	45.50‡	45.50‡	49.00†
No. 1 cast, Philadelphia	*41.50*‡	44.50‡	48.00‡	49.00†
No. 1 cast, Chicago	44.50‡	44.00‡	44.00‡	49.00†

* Basing Pt. † Shipping Pt.
Not including broker's fee after Feb. 7, 1951.
‡ Del'd., includes broker's fee.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	$1.39
Zinc, East St. Louis	19.50	19.50	19.50	17.50
Lead, St. Louis	*14.80*	16.80	16.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	53.55
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	44.00	44.00	50.00	42.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.

	Finished Steel Base Price	Pig Iron	Scrap Steel
May 13, 1952	4.131¢ per lb.	$52.77 per gross ton	$42.00 per gross ton
One week ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton

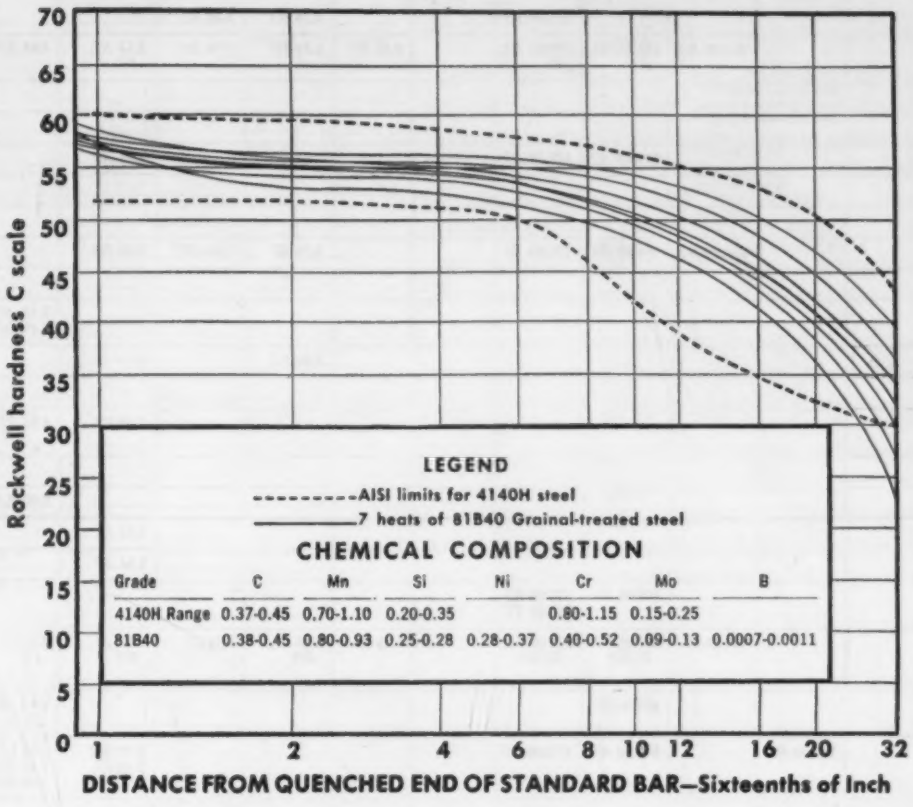
	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1952	4.131¢ Jan. 1	4.131¢ Jan. 1	$52.72 Jan. 1	$52.72 Jan. 1	$42.00 Jan. 1	$42.00 Jan. 1
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	52.72 Oct. 9	52.69 Jan. 2	47.75 Jan. 30	42.00 Oct. 23
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	18.92 May 22
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.27207¢ May 16	22.61 Sept.19	20.61 Sept.12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar.30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug.11	17.75 Dec. 21	12.67 June 8
1929	2.31773¢ May 28	2.26498¢ Oct. 29	1871 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

STANDARD (END QUENCH) HARDENABILITY CHART—



Consistent Hardenability obtained in Boron Steels made with GRAINAL ALLOYS

The most common test for boron steels is measurement of hardenability by the end quench or Jominy hardenability test. Today's steel substitutions are made on the basis of similar hardenability since a reasonable prediction can thus be made of the hardness and strength of a given part.

The curves above show the relationship between the hardenability of a series of seven heats of 81B40 steel and the hardenability band for 4140H steel, which it often replaces. The 81B40 heats were made in one electric furnace shop, and the remarkably consistent hardenability shown by the curves was obtained by the use of Grainal alloy as the means of adding the boron.

Consistent hardenability means consistent strength and hardness after heat treatment, which is the aim of every fabricator. The best proof that the Grainal alloys insure this objective is found in the successful use of three million tons of Grainal-treated steels.

VANADIUM CORPORATION OF AMERICA

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MAKERS OF ALLOYS
VANCORAM
CHEMICALS AND METALS

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURAL		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$70.00 *B3*			3.70 *B3*	5.50 *B3*				
	Buffalo, N. Y.			$56.00 *B3*	$66.00 *B3, R3*	$70.00 *B3, R3*		4.45 *B3*	3.70 *B3*	5.50 *B3*	3.50 *B3, R3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Claymont, Del.													
	Centerville, Pa.													
	Conshohocken, Pa.				$73.00 *A2*	$77.00 *A2*					3.90 *A2*		5.55 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$56.00 *B3*	$66.00 *B3*	$70.00 *B3*			3.70 *B3*	5.50 *B3*	3.50 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.15 *A5* 5.85 *D1*		
	Phoenixville, Pa.								5.90 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 *B3*	4.65 *B3*	4.95 *A5, B3*	6.40 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.00 *R4*		
MIDDLE WEST	Alton, Ill.										3.95 *L1*			
	Ashland, Ky.										3.50 *A7*			
	Canton-Massillon				$66.00 *R3*	$70.00 *R3* $66.00 *T5*								
	Chicago, Ill.			$56.00 *U1*	$66.00 *U1, R3,W8*	$70.00 *U1, R3,W8*		4.45 *U1*	3.65 *U1, W8*	5.50 *U1*	3.50 *A1, W8*	4.90 *A1, I3*		
	Cleveland, Ohio				$66.00 *R3*							4.65 *A5, J3*		6.55 *A5* 6.70 *J3*
	Detroit, Mich.		$54.00 *R5*		$69.00 *R5*	$73.00 *R5*					4.40 *M2* 3.80 *G3*	4.85 *G3* 5.45 *M2* 5.60 *R5,D1*	5.95 *G3*	
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$56.00 *U1*	$66.00 *U1*	$70.00 *U1, Y1*		4.45 *I3*	3.65 *U1, I3*	5.50 *U1, I3* 6.00 *Y1*	3.50 *U1, Y1,I3*	4.90 *I3*	5.30 *U1, I3* 5.80 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											4.65 *A7*		
	Niles, Ohio Sharon, Pa.										4.00 *S1*	5.35 *S1*	5.40 *S1*	6.55 *S1*
	Pittsburgh, Pa.	$52.00 *U1*	$54.00 *U1, C11*	$56.00 *U1*	$66.00 *U1*	$70.00 *U1, C11*	3.35 *U1* 3.45 *J3*	4.45 *U1*	3.65 *U1, J3*	5.50 *U1, J3*	4.00 *S9,S7* 3.75 *A3* 3.50 *J3,A7*	4.65 *J3,A7* 5.00 *A3* 5.35 *B4,S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								3.90 *W3*		3.60 *W3*	4.85 *W3* 5.35 *F3*	5.75 *W3*	7.20 *W3*
	Youngstown, Ohio Warren, Ohio					$70.00 *Y1, C10*	3.35 *U1, R3*			6.00 *Y1*	3.50 *U1, R3, Y1*	4.65 *R3, Y1* 5.25 *C5,T4* 5.35 *B4*	5.30 *U1, R3* 5.80 *Y1*	6.55 *R3* 7.05 *Y1*
WEST	Fontana, Cal.	$79.00 *K1*	$80.00 *K1*	$75.00 *K1*	$85.00 *K1*	$89.00 *K1*			4.25 *K1*	6.10 *K1*	4.75 *K1*	6.30 *K1*	6.20 *K1*	6.95 *K1*
	Geneva, Utah				$66.00 *C7*				3.65 *C7*	5.50 *C7*				
	Kansas City, Mo.								4.25 *S2*		4.10 *S2*			
	Los Angeles, Calif.				$85.00 *B2*	$90.00 *B2*			4.25 *B2, C7*	6.05 *B2*	4.25 *B2,C7*	6.40 *C1*	6.05 *B2*	
	Minnequa, Colo.								4.10 *C6*		4.55 *C6*			
	San Francisco, Cal.				$85.00 *B2*				4.20 *B2*	6.00 *B2*	4.25 *C7,B2*		6.05 *B2*	
	Seattle, Wash.	$73.00 *S11*			$85.00 *B2*				4.30 *B2*	6.10 *B2*	4.50 *B2*		6.30 *B2*	
SOUTH	Atlanta, Ga.										4.05 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$56.00 *T2*	$66.00 *T2*				3.65 *R3,T2*	5.50 *T2*	3.50 *R3,T2*		5.30 *T2*	
	Houston, Texas		$62.00 *S2*		$74.00 *S2*	$78.00 *S2*			4.05 *S2*		3.90 *S2*			

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.	
													Bethlehem, Pa.
3.60 *B3*	4.35 *B3*				5.40 *B3*	6.55 *B3*			4.10 *W6*				Buffalo, N. Y.
										† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb, deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb, add 25¢;,0.75-lb, add,65¢.			Claymont, Del.
													Coatesville, Pa.
4.00 *A2*					5.65 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.10 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.60 *B3*	4.35 *B3*	4.80 *B3*			5.40 *B3*	6.55 *B3*	6.75 *B3*		4.20 *B3*	$8.55 *B3*	$7.25 *B3*		Sparrows Pt., Md.
									4.40 *A5*				Worcester, Mass.
									4.20 *R4*				Trenton, N. J.
									4.40 *L1*				Alton, Ill.
3.60 *A7*		4.80 *A7*	4.65 *A7*										Ashland, Ky.
		4.80 *R3*											Canton-Massillon
3.60 *W8*					5.40 *U1*				4.10 *A5,R3, N4*				Chicago, Ill.
3.60 *R3,J3*	4.35 *R3,J3*		4.65 *R3*		5.40 *R3,J3*	6.55 *R3,J3*			4.10 *A5*				Cleveland, Ohio
3.80 *G3* 4.40 *M3*	4.55 *G3*				5.95 *G3*	7.10 *G3*							Detroit, Mich.
													Duluth, Minn.
3.60 *U1, Y1,I3*	4.35 *U1, Y1,I3*	4.80 *U1,I3*	4.65 *U1,I3*	5.20 *U1*	5.40 *U1,I3* 5.90 *Y1*	6.55 *U1,I3* 7.05 *Y1*		5.40 *I3*	4.10 *Y1*	$8.45 *B3, U1, Y1*	$7.15 *U1,I3*	5.85 *U1* 5.30 *Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.05 *G2*	5.50 *G2*	5.35 *G2*								$7.35 *G2*	6.05 *G2*	Granite City, Ill.
		5.20 *C9*											Kokomo, Ind.
	4.35 *A7*		4.65 *A7*	5.20 *A7*									Middletown, Ohio
5.25 *N3* 4.80 *S1*		6.00 *N3*		6.00 *N3*	5.40 *S1*								Niles, Ohio Sharon, Pa.
3.60 *U1, J3,A7* 3.75 *A3*	4.35 *U1, J3,A7*	4.80 *U1*	4.65 *U1*		5.40 *U1,J3*	6.55 *U1,J3*	7.20 *U1*		4.10 *A5* 4.30 *P6*	$8.45 *U1,J3*	$7.15 *U1,J3*	5.85 *U1*	Pittsburgh, Pa.
									4.30 *P7*				Portsmouth, Ohio
3.60 *W3,W5*	5.35 *F3* 4.35 *W3,W5*	4.80 *W3,W5*		5.20 *W3,W5*	5.75 *W3*	6.90 *W3*				$8.45 *W3,W5*	$7.15 *W3,W5*	6.15 *W5* 5.85 *F3*	Weirton, Wheeling, Follansbee, W. Va.
3.60 *U1, R3,Y1*	4.35 *R3, Y1*	5.50 *R1*	4.65 *Y1*	6.05 *E2*	5.40 *U1,R3* 5.90 *Y1*	6.55 *R3* 7.05 *Y1*		6.05 *R1,E2*	4.10 *Y1*	$8.45 *R3*	$7.15 *R3*		Youngstown, Ohio Warren, Ohio
4.55 *K1*	5.30 *K1*				6.35 *K1*	7.50 *K1*			4.90 *K1*				Fontana, Cal.
3.70 *C7*													Geneva, Utah
													Kansas City, Mo.
4.30 *C7*		5.55 *C7*						5.40 *C7*	4.90 *B2,C7*	$9.20 *C7*	$7.90 *C7*		Los Angeles, Cal.
									4.35 *C6*				Minnequa, Colo.
4.30 *C7*	5.30 *C7*	5.55 *C7*											San Francisco, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.60 *R3,T2*	4.35 *T2*	4.80 *R3,T2*			5.40 *T2*			4.75 *R3*	4.10 *R3,T2*	$8.55 *T2*	$7.25 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.50 *S2*				Houston, Texas

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				4.30 *B3*	5.40 *B3*	5.55 *B3*					
	Buffalo, N. Y.	3.70 *B3,R3*	3.70 *B3,R3*	4.60 *B5*	4.30 *B3,R3*	5.40 *B3*	5.55 *B3*	3.70 *B3*				4.85 *W6*
	Claymont, Del.							4.15 *C4*		4.85 *C4*		
	Coatesville, Pa.							4.15 *L4*		5.25 *L4*		
	Conshohocken, Pa.							4.15 *A2*	4.75 *A2*	5.05 *A2*	5.90 *A2*	
	Harrisburg, Pa.							6.30 *C3*	6.30 *C3*			
	Hartford, Conn.			5.10 *R3*		5.85 *R3*						
	Johnstown, Pa.	3.70 *B3*	3.70 *B3*		4.30 *B3*		5.55 *B3*	3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Newark, N. J.			5.00 *W10*		5.75 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 *W10*								
	Sparrows Point, Md.		3.70 *B3*					3.70 *B3*		4.75 *B3*	5.65 *B3*	4.95 *B3*
	Worcester, Mass.					5.75 *A5*						5.15 *A5,W6*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.15 *L1*										5.05 *L1*
	Ashland, Ky.							3.70 *A7*				
	Canton-Massillon	3.70 *R3*		4.55 *R3,R2*	3.95 *T5* 4.30 *R3*	4.90 *T5* 5.40 *R3,R2*						
	Chicago, Ill.	3.70 *U1,R3, W8*	3.70 *R3*	4.55 *A5,B5, W8,W10*	4.30 *U1,R3, W8*	5.40 *R3,W8, W10,B5,L2* 5.45 *A5*		3.70 *U1,W8*	4.75 *U1*	4.75 *U1*	5.65 *U1*	5.10 *W7* 4.85 *R3,A5, K2,N4*
	Cleveland, Ohio	3.70 *R3*	3.70 *R3*	4.55 *A5,C13*		5.45 *A5*	5.55 *R3,J3*	3.70 *R3,J3*	4.75 *J3*		5.65 *R3,J3*	4.85 *A5,C13*
	Detroit, Mich.	3.85 *R5*		4.70 *P8,R5* 4.80 *P3*	4.45 *R5* 4.65 *G3*	5;50 *R5* 5.55 *P8* 5.60 *P3*						
	Duluth, Minn.											4.85 *A5*
	Gary, Ind. Harbor, Indiana	3.70 *U1, Y1, I3*	3.70 *U1,I3, Y1*	4.55 *R3,M5, L2*	4.30 *U1,I3, Y1*	5.40 *R3,M5, L2*	5.55 *U1,I3* 6.05 *Y1*	3.70 *U1,I3, Y1*	4.75 *I3*	4.75 *U1*	5.65 *U1,I3* 6.15 *Y1*	5.10 *M4*
	Granite City, Ill.							4.40 *G2*				
	Kokomo, Ind.											4.95 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 *S1*		5.20 *S1*	5.70 *S1*	
	Pittsburgh, Pa.	3.70 *U1,J3*	3.70 *U1,J3*	4.55 *R3,A5, J3,S8,W10, C8*	4.30 *U1,C11*	5.40 *C11,S8, W10,C8,A5*	5.55 *U1,J3*	3.70 *U1,J3*	4.75 *U1*	4.75 *U1*	5.65 *U1,J3*	4.85 *A5,J3* 5.10 *P6*
	Portsmouth, Ohio											5.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	3.85 *W3*						4.00 *W3,W5*				
	Youngstown, Ohio Warren, Ohio	3.70 *U1,R3, Y1*	3.70 *U1,R3, Y1*	4.55 *Y1,F2*	4.30 *U1, Y1, C10*	5.40 *Y1,C10, F2*	5.55 *U1* 6.05 *Y1*	3.70 *U1,R3, Y1*			5.65 *R3* 6.15 *Y1*	4.85 *Y1*
WEST	Fontana, Cal.	4.40 *K1*	4.40 *K1*		5.35 *K1*		6.60 *K1*	4.30 *K1*		5.70 *K1*	6.25 *K1*	
	Geneva, Utah							3.70 *C7*			5.65 *C7*	
	Kansas City, Mo.	4.30 *S2*	4.30 *S2*		4.90 *S2*							5.45 *S2*
	Los Angeles, Cal.	4.40 *C7,B2*	4.40 *C7,B2*	6.00 *B2,R3*	5.35 *B2*		6.25 *B2*					5.80 *C7,B2*
	Minnequa, Colo.	4.15 *C6*	4.50 *C6*					4.50 *C6*				5.10 *C6*
	San Francisco, Cal.	4.45 *B2* 4.40 *C7*	4.45 *B2* 4.40 *C7*				6.30 *B2*					5.80 *C7*
	Seattle, Wash.	4.45 *B2*	4.45 *B2*				6.30 *B2*	4.60 *B2*			6.55 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.10 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.70 *R3,T2*	3.70 *R3,T2*				5.55 *T2*	3.70 *R3,T2*			5.65 *T2*	4.85 *R3,T2*
	Houston, Tex.	4.10 *S2*	4.10 *S2*		4.70 *S2*			4.10 *S2*				5.25 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Steel Corp., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Geneva Steel Co., Salt Lake City
G2 Globe Iron Co., Jackson, O.
G3 Granite City Steel Co., Granite City, Ill.
G4 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mill Co., Seattle,

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal, Iron & R. R. Co., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Co., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

Steel Prices

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except B'ham, San Fran., Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Phila., add 25¢; N. Y., add 30¢.)

WAREHOUSES — Cities	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates: Standard Structural	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	5.54–6.44	6.80–7.85	8.20	6.03	.....	6.13	6.13	6.01	6.63	.....	.....	.....	.....
Birmingham*	5.59	6.37	7.28–7.35¹	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	6.20	6.98	8.35–8.59	6.15–6.50	7.74–8.70	6.38–6.63	6.20–6.22	6.05–6.88	6.61–6.99	10.25–10.30	10.55–11.50	11.95	12.15–12.25
Buffalo	5.50–5.54	6.28–6.32	8.20–8.23	5.86–6.10	.....	5.89–5.98	5.90–5.82	5.52–5.55	6.18–6.45	10.15	10.45–10.48	11.80	12.10–12.13
Chicago	5.54	6.32	7.85	5.49	.....	5.65–5.70	5.65	5.47	6.05–6.30	.....	10.10	.....	11.75
Cincinnati*	5.84	6.38	8.29	5.77	.....	6.14	6.09	5.75	6.64	.....	10.49	.....	12.14
Cleveland	5.54	6.32	7.96–7.98	5.65	.....	5.82–5.95	5.95–5.98	5.77–5.95	6.15–6.40	.....	10.21	.....	11.86
Detroit	5.70	6.50	8.47	6.15	.....	6.14	6.09	5.74	6.64	.....	10.45	.....	12.10
Houston	6.35–6.58	7.37–8.09	8.57	6.15	.....	6.39–6.42	6.32–6.35	6.38	8.38–8.63	10.95	11.12–11.25	11.40	12.62–12.90
Indianapolis, del'd	5.94	6.72	8.25	5.89	.....	6.10	6.05	5.87	6.80	.....	10.50	.....	.....
Kansas City	6.22–6.40	7.64–7.68	8.66–8.70	6.10–6.90	7.81	6.38–6.74	6.43–6.48	6.20–6.77	7.01–7.22	10.00	10.10	11.50	11.80
Los Angeles	6.30	8.10–8.45	9.30–9.35	6.40	10.45	6.30	6.30	6.25–6.35	8.15	11.30	11.30	13.05	13.50
Memphis*	6.25	7.03	7.51	6.20	.....	6.36	6.36–6.61	6.33–6.57	7.11	.....	.....	.....	.....
Milwaukee	5.70	6.48	8.01	5.65	.....	5.81–5.86	5.81	5.63	6.31–6.61	.....	10.26	.....	.....
New Orleans*	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....	.....	.....
New York*	6.09–6.52	6.87–6.91	8.25–8.45	6.27–7.19	7.67	6.44–6.88	6.07–6.40	6.19–6.42	6.99–7.29	10.45	10.48–10.75	12.10	11.40–12.40
Norfolk	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....	.....	.....
Philadelphia*	5.79–6.07	6.72–7.22	8.10–8.38	6.08–6.35	7.15	6.05–6.19	5.84–6.09	6.02–6.27	6.91–7.16	9.82–10.17	10.22–10.47	11.82	11.89–12.12
Pittsburgh	5.54	6.32	7.85–8.25	5.59–5.84	.....	5.65–5.70	5.65	5.47	6.15–6.40	.....	10.10	.....	11.75
Portland	7.25	8.70–9.00	9.10–9.25	7.30	.....	6.80	7.17	7.00	8.65	.....	.....	.....	.....
Salt Lake City	7.95	.....	9.80–10.35	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco*	6.51–6.59	7.88–8.23	9.10–9.25	6.44–6.60	10.45	6.40–6.50	6.25	6.34–6.45	8.15–8.20	11.30	11.30	13.05	13.50
Seattle	6.14–6.81	7.84–8.44	9.55	7.40–7.70	.....	6.63–6.78	6.50–6.70	6.50	8.80–8.85	.....	.....	.....	.....
St. Louis	5.73–5.82	6.60–7.15	8.13	5.77–6.36	7.66	6.02–6.07	6.02–6.22	5.75–5.80	6.43–6.68	10.08	10.38	11.73	12.03
St. Paul*	6.14	6.92	8.45	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.
EXCEPTIONS: (1) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa. *U1;*, Washington, Pa., *W2;* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*
Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* New Britain, Conn., *S7;* Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7;* Wallingford, Conn., *W1.*
Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*
Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Trenton, N. J., *R4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*
Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*
Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*
Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*
Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*
ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.
WASHINGTON STEEL—Slightly lower on 300 series except where noted.

UNIVERSITY OF MICHIGAN LIBRARIES

PIPE AND TUBING

Base discounts, f.a.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. *B3*	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland *R3*	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland *K1*	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh *J3*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh *N2*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill. *L1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon *M3*	36.0	13.0	39.0	17.0	41.5	21.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh *N1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling *W5*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland *W4*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt. *B3*	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland *R3*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland *K1*	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh *J3*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill. *L1*	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0	....	....	....	....	....	....
Sharon *M3*	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh *N1*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling *W5*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland *W4*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	35.5	15.0	39.5	19.0	41.0	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ¼ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 19.50¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge *A3*	....	7.25	8.50	9.30	9.85	....	....
Granite City *G3*	....	7.95	9.20	....	....	....	....
Ind. Harbor *B3*	6.75	7.25	....	....	....	....	....
Mansfield *E2*	7.25	7.75	9.00	9.80	....	....	....
Niles, O. *N3*	7.05	7.55	....	....	....	....	....
Vandergrift *U1*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O. *R3*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville *A7*	6.75	7.25	8.50	9.30	9.85	10.40	11.10

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50	....	....	....
Birmingham *R3*	48.38	48.88	....	....	....	....	....
Birmingham *W9*	48.38	48.88	....	....	....	....	....
Birmingham *S5*	48.38	48.88	....	....	....	....	....
Buffalo *R3*	52.00	52.50	53.00	....	....	....	....
Buffalo *H1*	52.00	52.50	53.00	....	....	63.75	....
Chicago *I4*	52.00	52.50	52.50	53.00	....	....	....
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00	....	....
Cleveland *R3*	52.00	52.50	52.50	....	....	....	....
Daingerfield, Tex. *L3*	48.00	48.50	48.50	....	....	....	....
Duluth *I4*	52.00	52.50	52.50	53.00	....	....	....
Erie *I4*	52.00	52.50	52.50	53.00	....	....	....
Everett, Mass. *M6*	....	59.75	60.25	....	....	....	....
Fontana *K1*	58.00	58.50	....	....	....	....	....
Geneva, Utah *U1,Y1*	52.00	52.50	52.50	53.00	....	....	....
Granite City, Ill. *K3*	53.90	54.40	54.90	....	....	....	....
Hubbard, Ohio *Y1*	52.00	52.50	52.50	....	....	....	....
Ironton, Utah *C7*	52.00	52.50	....	....	....	....	....
Jackson, Ohio *J1,G1*	....	....	....	....	....	62.50	....
Lyle, Tenn. *T3*	....	....	....	....	....	....	66.00
Monessen *P6*	54.00	....	....	....	....	....	....
Neville Island *P4*	52.00	52.50	52.50	53.00	....	....	....
Pittsburgh *U1*	52.00	....	....	53.00	....	....	....
Sharpsville *S3*	52.00	52.50	52.50	53.00	....	....	....
Steelton *B3*	54.00	54.50	55.00	55.50	60.00	....	....
Swedeland *A2*	56.00	56.50	57.00	57.50	....	....	....
Toledo *I4*	52.00	52.50	52.50	53.00	....	....	....
Troy, N. Y. *R3*	54.00	54.50	55.00	....	60.00	....	....
Youngstown *Y1*	52.00	52.50	52.50	53.00	....	....	....
N. Tonawanda, N. Y. *T1*	....	52.50	53.00	....	....	....	....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

BOILER TUBES

Per 1000 ft. cut, 10 to 24 ft. F.a.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	39.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.08	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.59	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.16	....	....

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipment less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa. *S9*	....	6.80	7.40	9.35	11.65
Cleveland *A5*	4.65	6.45	7.40	9.35	11.65
Detroit *D1*	5.60	6.65	7.25	....	....
New Castle, Pa. *B4*	5.35	6.80	7.40	9.35	....
New Haven, Conn. *D1*	5.85	6.75	7.35	....	....
Sharon, Pa. *S1*	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. *W3*	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. *A5*	4.95	6.75	7.70	9.65	11.95
Youngstown *C5*	....	6.80	7.40	9.35	11.65

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Manufacturers Wire Assn. 12½ Gauge ¢/lb.	Manufacturers Wire Assn. Spring Wire Gauge ¢/lb.
Alabama City *R3*	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa. *J3*	118	132	....	....	136	140	5.70	6.15
Atlanta *A8*	121	133	....	126	126	143	5.95	6.40
Bartonville *K2*	118	130	....	123	143	143	5.70	6.15
Buffalo *W6*	....	....	....	....	....	....	4.85	....
Cleveland *A6*	125	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	....	5.70	6.15
Crawfrdsvl. *M4*	....	132	....	....	....	145	5.95	6.40
Donora, Pa. *A5*	118	130	....	123	140	140	5.70	6.15
Duluth *A5*	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala. *T2*	118	130	....	123	....	140	5.70	6.15
Houston *S2*	126	138	....	....	....	148	6.10	6.55
Johnstn., Pa. *B3*	118	130	....	....	140	....	5.70	6.15
Joliet, Ill. *A5*	118	130	....	123	....	140	6.70	6.15
Kokomo, Ind. *C9*	120	132	....	125	138	142	5.80	6.05
Los Angeles *B2*	....	....	....	....	....	....	6.65	....
Kansas City *S2*	130	....	....	135	....	152	6.30	6.75
Minnequa *C6*	123	138	130	128	146	146	5.95	6.45
Monessen *P6*	124	135	....	....	....	145	5.95	6.40
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	137	....	....	147	156	160	6.65	6.80
Portsmouth *P7*	124	137	....	....	147	147	6.10	6.60
Rankin, Pa. *A5*	118	130	....	....	140	140	5.70	6.15
So. Chicago *R3*	118	126	140	123	....	136	5.70	5.95
S. San Fran. *C6*	....	....	....	147	....	160	6.65	7.10
Sparrows Pt. *B3*	120	....	....	125	142	142	5.80	6.25
Sterling, Ill. *N4*	118	130	....	123	140	140	5.70	6.15
Struthers, O. *Y1*	....	....	....	....	....	....	6.70	6.15
Torrance, Cal. *C7*	138	....	....	....	....	....	6.65	....
Worcester *A5*	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa. *S10*	....	....	150	....	....	....	....	....

Cut Nails, carloads, base $7.35 per 100 lb. (loss 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va., (*W5*), $7.15.

* Alabama City and So. Chicago don't include zinc extra.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.60	4.00	4.70	....	....	....	....	....
Chicago *R3*	....	....	....	6.15	....	....	....	....
Cleveland *R3*	....	....	....	....	....	9.35	....	....
Ensley *T2*	3.60	4.00	....	....	....	....	....	....
Fairfield *T2*	....	4.00	4.70	6.15	5.60	....	4.50	9.80
Gary *U1*	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor *I3*	3.60	....	4.70	6.15	5.60	....	4.50	....
Johnstown *B3*	....	4.00	....	....	5.60	....	....	....
Joliet *U1*	....	4.00	4.70	....	....	....	....	....
Kansas City *S2*	....	....	....	6.40	....	....	....	9.85
Lackawanna *B3*	3.60	4.00	4.70	....	....	....	4.50	....
Lebanon *B3*	....	....	....	6.15	....	9.35	....	9.85
Minnequa *C6*	3.60	4.50	4.70	6.15	....	....	4.50	9.85
Pittsburgh *R3*	....	....	....	....	....	9.35	....	....
Pittsburgh *O1*	....	....	....	....	....	9.35	....	9.85
Pittsburgh *P5*	....	....	....	....	....	....	....	9.85
Pittsburgh *J3*	....	....	....	6.15	....	....	....	....
Pitts., Cal. *C7*	....	....	....	....	....	....	4.65	....
Seattle *B2*	....	....	....	6.65	....	....	4.65	....
Steelton *B3*	3.60	....	4.70	....	....	....	4.50	....
Struthers *Y1*	....	....	....	6.15	....	....	....	....
Torrance *C7*	....	....	....	....	....	....	4.65	....
Youngstown *R3*	....	....	....	6.15	....	....	....	....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I7*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

*Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.03
10, 12	60	8.57
8	60	8.84
	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg. Reg.	K.	Less Keg. Hvy.	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	36	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	29½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished . 48—10
Packaged, plate finish ..... 31—10
Bulk, plain finish** 62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger $7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
⅝ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded balt., Chester $32.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$62.70
Domestic, f.o.b. Chewalah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ ... $13.75

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports) *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

Based on 1951 contracts.

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungstein, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

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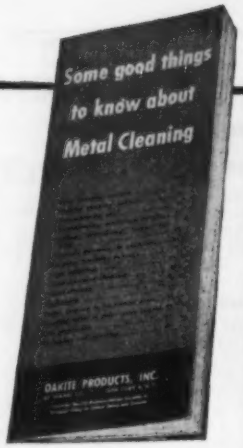

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- ☐ Electrocleaning
- ☐ Pickling
- ☐ Pre-paint treatment
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
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Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.30% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C.	1.10
9 to 12% C.	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn. penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

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2

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IT PAYS TO READ IRON AGE ADS TOO!

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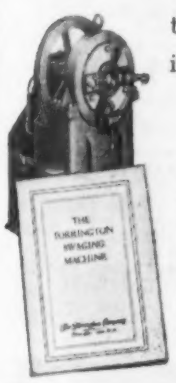
Torrington Swaging Machines offer an ideal method of attaching ferrules and cable ends to wire or rod. Rapid hammer blows (4000 a minute) tighten the ferrule quickly around the rod – producing a bond that withstands as much tensile strain as the inner member alone.



"The Torrington Swaging Machine" tells you how to do a better job of shaping many metal parts, and save money, too. It also describes the complete line of Torrington machines. Write for your free copy...today!

THE TORRINGTON COMPANY
Swager Department
555 Field Street • Torrington, Conn.

Makers of
TORRINGTON NEEDLE BEARINGS

—Ferroalloy Prices—

Continued

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C 7.00% max. Si	21.25	23.10	24.30

Alsifer, 20%Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn 19.15¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.000. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Turn Page

"Joe, where can we get these small parts in the quantity we need?"

"From Torrington, Tom! They turn out hundreds of thousands of precision metal parts a day."

Batteries of automatic and semi-automatic machines are working steadily and efficiently at Torrington, keeping many of the nation's leading manufacturers supplied with small precision metal parts made to their specifications. Whether you need a tremendous quantity of parts on a regular basis, or only an occasional few, we can furnish them at a surprisingly low cost.

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A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

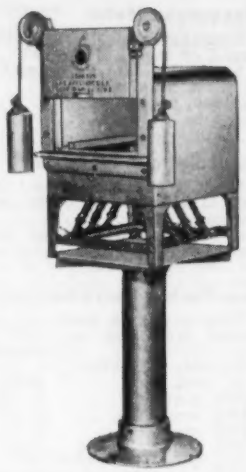
JOHNSON GAS APPLIANCE CO.

598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style $278.00
Bench Style $250.00

Johnson No. 654 Pedestal Style $150.00
Bench Style $124.00

F.O.B. Factory



Model No. 706

JOHNSON

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RED-CIRCLE Rolls for all purposes

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Hyde Park *Red Circle* rolls are outstanding in quality and in performance, and are easily identified by the *Red Circle*.

For finer finish—long life and greater tonnage, specify *Red Circle*.

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FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.

ROLLS • ROLLING MILL MACHINERY • GREY IRON CASTINGS

Ferroalloy Prices

Continued

Ferrocolumbium, 50-60%, 1 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.50
Less ton lots 4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.41

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W,5 ton lots, delivered $5.00

Ferrovanadium, 35-55% contract basis, delivered, per pound, contained V.
Openhearth .....$3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.35

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.31

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Boroxil, contract prices per lb of alloy, del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.35

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up .85
10 to 14% B..... 1.20
14 to 19% B..... 1.50
19% min. B 1.80

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.45
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered. $1.30
Less ton lots .....

Silenz, contract basis, delivered.
Ton lots ..... 45.00¢

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Low in Cost. Durable. Easy to operate. Table adjustable for straight or taper keyways. Three sizes. Keyways 1/16" up to 1".

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THE MODERN TIN PLATE

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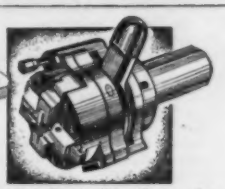
WHEELING STEEL CORPORATION
WHEELING, WEST VIRGINIA

H&G Insert Chaser DIE HEADS



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ABRASIVE CUTOFF MACHINES
. . . for bar stock and shapes

3-H.P. line—wet and dry cutting, bevel or rt. angle. Capacity: ¾" solids; 2" tubing; 2" x 6" lt. sheet formed sections; ½" x 1" flats.

10-H.P. line—wet cutting, rt. angle or bevel. Capacity: 2½" solids; 3" x ⅜" angles; 4½" tubing; ¾" x 3" flats. Write for literature. Specify shape, size and material to be cut.

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Machines for 1/16" to ¾" Rod. Rounds and Shapes.

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Ingersoll Rand 33" x 20½" x 24" Complete with 635 H.P. G. E. Syn. Motor 2300/3/60.
2873 cu. ft. Worthington 29" x 21" x 18½" x 21". Complete with Elec. Equipment.

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No. 6 Hilles & Jones Pyramid Type Plate Bending Roll, Capacity 16' x ¾" Plate Complete with Electrical Equipment.

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16' x 1¼" Dreis & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

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#9 William White Bulldozer, Motor Driven with 50 H.P. Motor. 440 v. 3 ph. 60 cycle. Face of Crosshead 20" x 90", Movement of Crosshead 24".

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5 ton Niles 56' 4" Span, Three 440 volt 3 phase 60 cycle motors.
5 ton Shaw 70' Span, Three 230 Volt D. C. Motors Equipt for Magnet Operation, without Magnet.

DIE CASTING MACHINE
Model BA-12 KUX Die Casting Machine, Air Operated, Plunger Gooseneck Type for zinc, lead and tin. Die space between bars 12¼" x 12¼", Die Separates 8". NEW 1949, never used.

FLANGING MACHINES
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment and numerous dies.

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400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.
25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

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600 H.P. Farrell Birmingham Herringbone Gear Unit. R.P.M. 7.20 to 74.54 NEW.

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10,000 lb. Chambersburg Steam Drop Hammer.

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#16 Espen Lucas Rotary Planer or Column Facer 30" Diameter Cutter Head, Motor Driven.

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48" x 48" x 20' Cincinnati, Four Head
48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

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Type "B" Crown Full Automatic Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

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1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" Stroke, 18" Shut Height.

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8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.
12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.
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TESTING MACHINES
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.
100,000 lb. Olsen Universal Hydraulic Testing Machine. Three Dial Type

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ⅛" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2¼" max.

WELDERS
700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 4" to 35" Diameter x 12" Wide.
40 KVA Sciaky, Spot Welder, 36" Throat 440/3/60 operation.

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Await Direction—Machine tool market in Chicago remains relatively unchanged. Used machines continued to move fairly well. Below ceiling prices at recent auctions have been reported. Used machine tool men are awaiting some kind of direction in their attack on Office of Price Stabilization pricing schedules to follow the Machinery Dealers National Assn. Convention in New York.

Employment Problems — Employment of skilled rebuilders is still tough. Help is available, but finding men who can do a good job on a number of machine tool types remains a problem. Any business slowdown is not reflected in the present employment picture. There has been no shortage of supervisory personnel. Main trouble is finding skilled workmen at the operating level.

Possible solution is cutting manhours per item of work. One firm found a partial answer in a grinding machine of their own concoction. It is claimed to cut work time 70 pct.

Substitution — Grinder was originally designed to handle the harder metals that are more frequently being put into industrial tools. Hardened beds of lathes and turret lathes are an example, particularly those designed to work very hard metals used in the aircraft jet program.

Using a Cincinnati Milling Machine Co. Simcool coolant system, a 48x48-in. by 20-ft heavy planer has been equipped with a heavy duty Blanchard head. Similar units have been used in the East.

Expansion Off — Used machine tool men are interested in cost-cutting and high output equipment. But they are in a number of instances shying from expansion programs. Primary reason seems to be taxes, which have siphoned off too much capital.

Secondary reason is growing caution on the part of used tool dealers. Always a canny lot, in recent months they have been buying carefully, paring inventories. They are less and less interested in older tools. Gambles on older machine tools were made in the past, but this attitude seems to be dying.

Ups and Downs—In Cleveland the used machinery market is having its ups and downs. Some dealers report business up 15 to 20 pct during the last month. Others claim it is continuing at the slightly depressed levels of the past few months. Those enjoying increased volume attribute rises to greater availability of materials which enables manufacturers to boost civilian production.

Solidification of defense programs has also helped. Manufacturers now have a better idea what machines they will need for commercial work. Despite these encouraging signs, buyers are still reluctant to pick up equipment of older vintage. Good late-type machinery is still scarce and in high demand.

Less Promising—Used machinery news in New York is less reassuring. Business remains at status quo. Buyers were not forming lines. Smattering of good used farm equipment sales has been noted as was activity in fabricating and iron construction machinery.

Holding Firm—Rebuilt machinery appears to be holding its own throughout the nation. No high points are indicated. A few items are in short supply but most types are readily available.

Rebuilders are becoming increasingly concerned about the influx of new European machinery. Carrying lower price tags than secondhand domestic equivalents, imported machinery is cutting into rebuilt sales.

Many dealers anticipate a temporary lull as a result of uncertainty about presidential elections.